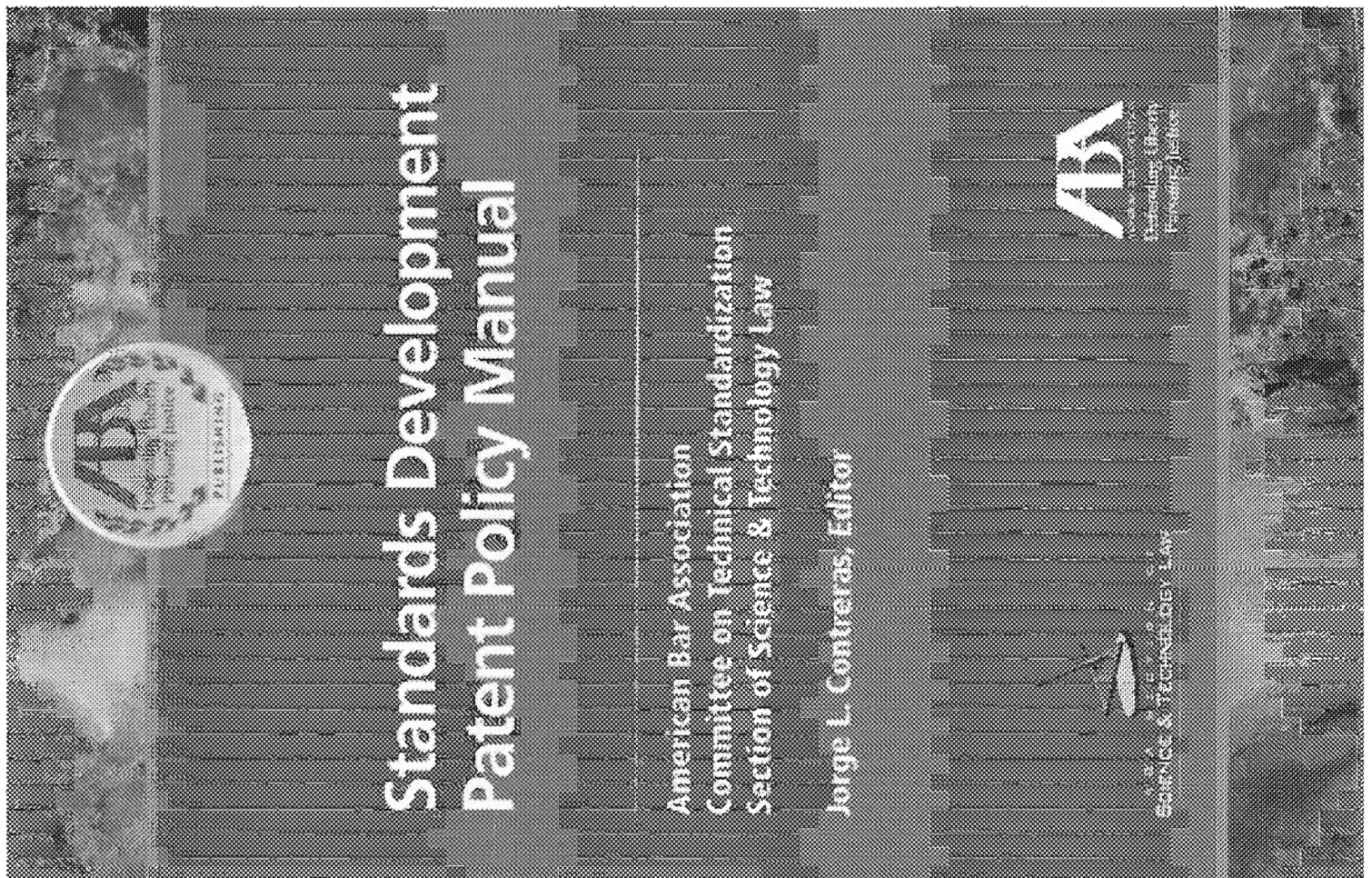


EXHIBIT 17





Standards Development Patent Policy Manual

American Bar Association
Committee on Technical Standardization
Section of Science & Technology Law

Jorge L. Contreras, Editor



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FOREWORD

The Section of Science and Technology of the American Bar Association is pleased to present the *Standards Development Patent Policy Manual*. We are hopeful that this publication will serve as a valuable resource for technical standards organizations, standards developers, and lawyers with an interest in technical standards for many years to come.

This publication was prepared under the auspices of the Committee on Technical Standardization. Jorge L. Contreras, Chair, served as its primary editor, with substantial editorial and substantive assistance from Marc Sandy Block, Michele Herman, Susan Hoyer, and Amy Marasco. This publication also benefited from the regular input and advice of a dedicated subcommittee of experts from industry, academia, and private practice including Chuck Adams, Kent Baker, Dan Bart, Larry Bassuk, Robert Bauer, Scott Bradner, Marc Braner, Pamela Deese, Ed Fiorito, Patricia Griffin, Hung Ling, Alan McGrath, Gil Ohana, Dorothy Raymond, Michelle Stammes, Richard Taffer, George Willingmyre, and, of course, the founder of the Committee, Ollie Smoot. We are grateful to the Section of Antitrust Law and the Section of Intellectual Property for their support in the preparation and discussion of this publication.

We would also like to thank Shawn Kaminski, Director of the Science and Technology Section, as well as the members of the Publications Committee who helped to make this project a reality.

William S. Coates
Chair, Section of Science and Technology Law
American Bar Association

E. DURATION OF PATENT DISCLOSURE OBLIGATION

SDO Participants may generally withdraw from the SDO and/or particular Working Groups at any time. A Participant's disclosure obligation should continue during the entire period of its Participation in the SDO. The SDO may wish to address the possibility of a prospective Participant transferring Essential Claims in anticipation of joining the SDO (see Section III.A.1). While an SDO might be concerned about a Participant withdrawing and then filing patent applications to cover aspects of a Standard initiated during its period of Participation, imposing a duty to disclose after withdrawal from the SDO is generally viewed as unnecessarily burdensome on Patent Holders. This concern is often addressed in the Licensing Commitment (see Section IV.E.1.a), which may require a withdrawing Participant to continue to offer licenses with respect to Essential Claims covering Standards developed during its period of Participation in the SDO under certain prescribed circumstances.

A Participant's disclosure obligations under Section III.A shall terminate

[upon its withdrawal from the SDO] [1]

and/or

[with respect to Essential Claims relating to a particular Standard, upon its withdrawal from the relevant WG]. [2]

[1] If the SDO wishes all of a Participant's disclosure obligations to terminate upon its withdrawal from the SDO, then this clause may be used.

[2] In addition, if the SDO wishes to allow a Participant's disclosure obligations with respect to a particular Standard to terminate upon its withdrawal from the relevant WG, then this clause may be used in addition to the clause in [1] above.

IV. LICENSING COMMITMENTS AND LICENSING STATEMENTS

As defined in Section I, a Licensing Commitment is an obligation requiring a Participant to grant licenses under its Essential Claims. A Licensing Commitment is not itself a license grant. It is merely an obligation to grant a license on terms such as RAND or RANDz.

A Licensing Statement is a document containing an affirmative statement in which a Participant makes a Licensing Commitment or otherwise discloses the general nature of the terms on which it would be willing to grant licenses under its Essential Claims. However, some SDOs impose Licensing Commitments without requiring any particular Licensing Statement (for example, the Licensing Commitment may be embodied in the SDO's organizational documents, bylaws, Participation Agreement, or the like). Again, a Licensing Statement generally does not constitute the grant of a license, but generally states the nature of the terms (e.g., RAND or RANDz) on which the Participant is willing to grant licenses.

A. LICENSING COMMITMENT

How a Licensing Commitment Arises

A Participant's Licensing Commitment may arise in various ways. As discussed in detail below, a Participant may be required to undertake a Licensing Commitment when it joins an SDO or a Working Group of an SDO, when it submits a Contribution, or when it submits a Licensing Statement. Some SDOs do not impose any obligation on Participants to make any Licensing Statement or to undertake any Licensing Commitment, although most do impose some form of Licensing Commitment.

Elements of a Licensing Commitment

A Licensing Commitment is not an actual license and generally does not include all of the terms that the Patent Holder may include in the licenses it offers to prospective licensees. The Licensing Commitment may, however, prescribe the general nature of some of the terms and/or prohibit other terms. The terms and conditions not expressly covered by the Licensing Commitment are typically negotiated on a bilateral basis between Patent Holders and Implementers, subject to any overarching requirements in the Licensing Commitment to be "reasonable" and "nondiscriminatory."

While negotiations are often bilateral, in an April 2007 FTC/DOJ Report, *Antitrust Enforcement and IP Rights: Promoting Innovation and Competition*, the agencies observed that "joint negotiation of licensing terms by standard-setting organization participants before the standard is set can be pro-competitive." Such negotiations are unlikely to constitute a per se antitrust violation. The agencies will usually apply a rule of reason analysis when evaluating these joint activities. The FTC/DOJ Report also concludes that, without more, a unilateral announcement of price terms does not violate section 2 of the Sherman Act. The agencies also took "no position as to whether SDOs should engage in joint ex ante discussion of licensing terms."

<http://www.ftc.gov/reports/innovation/P040101PromotingInnovationandCompetitionrpt0704.pdf>

The FTC/DOJ Report is consistent with Recommendation No. 20 issued by the Antitrust Modernization Commission in its April 2, 2007 Report and Recommendations (AMC Report) that "joint negotiations with intellectual property owners by members of a standard-setting organization with respect to royalties prior to the establishment of the standard, without more, should be evaluated under the rule of reason" (one of twelve commissioners dissenting).

http://www.amc.gov/report_recommendation/toc.htm

48 STANDARDS DEVELOPMENT PATENT POLICY MANUAL

It is important for Participants to understand their Licensing Commitments so that they do not commit to grant more license rights than they intend or become involved with standards development activities that may require them to grant licenses that they did not contemplate. Patent Holders must weigh the potential benefit of fully exercising patent rights against the benefit of promoting the standard, the industry, and their own business prospects. It is equally important for Implementers to understand the range of license terms and conditions they can generally expect Participating Patent Holders to offer. Implementers generally do not want to invest in the development and deployment of standards-based products if they believe that they will not be offered acceptable patent licenses. The SDO, in creating its Policy, must find a satisfactory balance between the interests of the Patent Holders that participate and contribute to the Standard, and the Implementers, whose adoption of the standard is vital for the standard's success.

Some SDOs also require different Licensing Commitments depending on a Participant's level of participation or authority within the SDO. For example, Participants who are part of the SDO's "steering committee" or "architecture board" may be required to grant licenses on RANDz terms, whereas more general Participants may be permitted to grant RAND licenses.

Other Factors

In practice, not all Patent Holders may require Implementers to obtain a license under their Essential Claims, even if permitted to do so under the Policy or even if they have submitted a Licensing Statement indicating general terms on which licenses may be offered. Such forbearance could, however, impede the Patent Holders' ability to enforce such Essential Claims later under various equitable theories. Moreover, an Implementer who has sufficient awareness of Essential Claims covering an implementation of a Standard could be liable for willful infringement absent a license, and may be at some risk by operating without a license, even if the Patent Holder does not appear to be enforcing its Essential Claims actively. These suppositions have not yet been considered by the courts, however, and Implementers should seek legal advice before taking any such action.

Note that, in some instances, a Participant may be permitted to elect to structure these grants of rights as covenants (similar to that described in Section IV.C.3 below) rather than licenses. Some commentators maintain, however, that a Participant offering a covenant should also offer a license as an alternative to permit bilateral negotiation. In any case, any such covenant must still meet all of the requirements of the SDO's Licensing Commitment.

An SDO drafting a patent policy and a company joining an SDO should consider how the SDO's policy will affect applicable business and development models of a participating company. For example, the open source software development model has emerged in various standards-setting environments. If a client plans to implement a standard with open source software, counsel should consider the interplay between the open source license commitment the client may have and the SDO commitment it may have. Today there are many open source implementations of RAND-based standards, although the authors are not aware of the circumstances under which these implementations are being practiced.

Similarly, if the SDO wants to attract software developers including open source developers, it may consider the interplay between the respective SDO's commitments, the rights of Patent Holders, open source license commitments, and the incentives to innovate within the scope of the standardization activity. Distributors of all products, including those involving open source software, must also understand that permitted license limitations may affect their ability to distribute products as they might otherwise prefer to do. In addition, the SDO should seek to balance the interests of Implementers (who may rely on differing business models) and the rights of Patent Holders (who may also rely on different business models) in developing its IPR Policy in order to attract a balance of stakeholder interests.

ANNOTATED POLICY CLAUSES 49

In some SDOs, the Licensing Commitment is as simple as a commitment to RAND or RANDz licensing terms and conditions. Other SDOs require or permit the Licensing Commitment to contain some or all of the terms described below, and many SDOs expressly permit the inclusion of such terms as part of their RAND Licensing Commitment.

1. Terms of the Licensing Commitment

Participant shall, [upon request] [1],
[grant/offer]

The Licensing Commitment is often stated as an absolute (i.e., that the Participant must grant the required licenses). However, it is reasonable to require that such licenses be granted only upon a request by a potential licensee and upon the conclusion of bilateral negotiations. It would be unreasonable for a Participant to be required to seek out its own licensees in this context, or to extend offers before being requested to do so.

[1] The Patent Holder must offer a license to a prospective Implementer upon request. If the Implementer and the Patent Holder do not agree on terms, the Implementer has three choices: (1) it can discourage the SDO from adopting the Standard if the Standard has not yet been adopted; (2) it can choose not to implement the Standard; or (3) it can implement the Standard without a license. If the Implementer chooses to implement the Standard without a license, the Patent Holder may in turn choose to sue the Implementer for patent infringement and seek all available remedies. The Implementer may rely on any applicable defense to infringement such as invalidity or noninfringement, and may also rely on other legal theories arguing that the license terms did not comply with the SDO's Licensing Commitment (e.g., they were not RAND).

Unless the Policy states otherwise, it is generally understood that a Patent Holder's obligation to offer a license under a Licensing Commitment is initially discharged after the Participant makes a good-faith offer of such license. If an Implementer refuses the license, it is not clear, however, whether or how often or for how long the Patent Holder must continue to make a license available. On one hand, it may not be reasonable to allow a Patent Holder to refuse a license to an Implementer who previously could not reach agreement with the Patent Holder, but on the other hand an Implementer should not have the ability to wait until the last minute

to demand a license (e.g., in the midst of a patent infringement action brought by the Patent Holder after the Infringer has attempted unsuccessfully to invalidate the relevant patents). An SDO that wishes to avoid disputes regarding these issues may wish to address them explicitly in its Policy.

SDOs must decide who will benefit from the Participants' Licensing Commitments—other Participants, or all Implementers.

Many SDOs seek to benefit all Implementers of a Standard. This approach is viewed by many to foster widespread adoption of a Standard.

Some SDOs, however, limit Licensing Commitments to other Participants, and Implementers who are not Participants cannot rely on such Licensing Commitments. Such limitations may be imposed because Participants may fear granting licenses to non-Participants that have no Licensing Commitments of their own. These restrictions may also encourage membership in the SDO by attracting Participants who seek licenses under the relevant Essential Claims. This limitation is seen more in "special interest groups" than in "traditional" SDOs.

So long as the Policy permits the Patent Holder to include a reciprocity provision in its license (see Section IV.A.2 below), the Patent Holder can obtain a reciprocal license from any non-Participant the Patent Holder chooses to license. Consequently Patent Holders would have an incentive to license both Participants and non-Participants even if the Policy imposes a Licensing Commitment only with respect to Participants. However, absent such a Licensing Commitment, non-Participants are not guaranteed that the Patent Holder will offer any license at all.

If it is anticipated that a Standard may be contributed to another standards organization that does not have this limitation, the SDO, in the Policy, may wish to consider extending the benefit of licenses to all Implementers. Another possibility would be to add a provision that would convert the Licensing Commitment to extend the benefit to all implementers *but only* in the event that the standard is contributed to such other standards organizations.

a. licensee(s)
to any [Implementer/Participant]

b. nonexclusivity
a nonexclusive

c. worldwide
worldwide

d. nontransferable
nontransferable/nonassignable

e. duration
(perpetual/____-year)

Perhaps the most common term included in a Licensing Commitment is nonexclusivity. The licenses offered by the Patent Holder must be nonexclusive to enable broad implementation of the standard.

Licensing Commitments often require the license to be "worldwide." However, "worldwide" does not necessarily mean that all worldwide rights are licensed under a single license or to each prospective licensee. Implementers may not want licenses to make, use, sell, etc., the standardized technology throughout the world and may seek licenses for only those regions where the Implementer anticipates practicing the Essential Claims.

Patent Holders may also want to offer different terms for practicing Essential Claims in different regions. This type of strategy, however, may raise questions about reasonableness and nondiscrimination if manufacturers in one jurisdiction are subject to substantially different terms from those in another.

Some SDOs may use the terminology "throughout the world" or "in any country" in the same context.

Some Licensing Commitments may permit the Patent Holder to offer licenses that are non-transferable or nonassignable. There may be a number of terms in the license that the Patent Holder believes are material to the license agreement with a specific licensee and therefore the Patent Holder does not want the license to be assigned or transferred without its knowledge and consent. Some licenses that are not transferable or assignable do include limited provisions permitting a licensee to transfer or assign its license upon notice to the Patent Holder and with its prior consent.

In a perpetual license, the license of each Essential Claim extends for the life of the applicable patent, unless there is some limiting condition expressed. Implementers often desire a perpetual license because they may not want to invest in a standardized technology believing that the license terms are acceptable, only to find out after the license terminates that the new terms offered by the Patent Holder are not acceptable to the licensee.

EXHIBIT 18

SEVENTH ANNUAL BAKER BOTTS LECTURE

UNDERSTANDING THE RAND COMMITMENT

*Doug Lichtman**

ABSTRACT

In a typical agreement between a buyer and a seller, price is one of the central terms specified in the deal. Yet, in a surprisingly large number of technology agreements, patent holders today are choosing to leave out that critical detail. Instead, in these modern agreements, patent holders adopt as their pricing term only a commitment to later price at a “reasonable and nondiscriminatory” rate. This RAND commitment has been used in patent deals covering everything from 3G cellular communication to DVD video playback. But why are firms adopting it? And how should courts interpret its language? In this Lecture, I take up these questions, considering the purpose behind this type of price ambiguity and ultimately arguing that, at its core, the RAND commitment is most likely a pro-competitive mechanism primarily designed to guide courts away from patent law’s conventional—and here largely inappropriate—damages regime.

* Professor of Law, UCLA. This Lecture was originally presented as the Spring 2010 Baker Botts Lecture at the Institute for Intellectual Property & Information Law, at the University of Houston Law Center. My thanks to Craig Joyce for inviting me to give that talk, to the many attendees that night who offered some amazingly helpful comments, and to readers Nick Chan, Amy Marasco, Joseph Miller, and Eric Posner. Additional comments are very much welcome. I can be reached at lichtman@law.ucla.edu.

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I. INTRODUCTION

Prior to adopting a technical standard, standard-setting organizations typically endeavor either to make sure that the standard does not infringe any patent rights or to clear the necessary permissions. The task is a difficult one. The protocol that governs how information is stored on DVD-R media, for example, is known to implicate at least 342 different patents.¹ The encoding, decoding, and transmission protocols relevant to just one type of cellular telephony touch well over 1,000.² And RFID technology—those electronic tags that Wal-Mart and the Department of Defense hope will someday transform inventory management—is at this point rumored to labor under the weight of over 4,000 issued patents in the United States alone.³

Those large numbers are problematic because it takes substantial time and money to evaluate a patent. To do the job

1. See *Patent List*, DVD6C LICENSING GROUP, http://www.dvd6cla.com/patentlist_15.html (last visited Oct. 4, 2010) (listing and offering to license 342 DVD-R patents).

2. See *Review of Patents Declared as Essential to WCDMA Through December, 2008*, FAIRFIELD RES. INT'L, 1, 9 (Jan. 6, 2009), <http://www.frlicense.com/wcdma1.pdf> (noting that over 1,889 patent families have to date been declared essential to WCDMA).

3. See Mark Robert, *New Report on RFID Patents*, RFID JOURNAL (Jul. 6, 2004), <http://www.rfidjournal.com/article/pdf/1016/1/1/rfidjournal-article1016.PDF> (mentioning that 4,279 RFID-related patents were issued in the United States before December 31, 2003).

right, consensus would have to be achieved as to whether the patent is valid, whether it covers a truly essential aspect of the standard at issue, and exactly how much the patent contributes as compared to next-best alternatives. Worse, all of that would need to be done in a context where patent holders have strong incentives to exaggerate;⁴ where information about pending patent applications is understandably hard to come by;⁵ and where there will often rage an independently contentious debate over non-patent issues like the specifics of what should and should not be included in the standard.

Thus enters the RAND commitment.⁶ Instead of undertaking the difficult task of evaluating asserted patents, most standard-setting organizations simply keep a running list of patents that have been asserted to be relevant by one or another patent-holding participant.⁷ Those participants are then required to agree that, ultimately, they will make available to the public, on “reasonable and nondiscriminatory terms,” any truly essential patent.⁸ The need for careful patent analysis is thereby diminished. If a given patent turns out to be irrelevant, no one will need a license for its use anyway. But if a given patent turns out to be essential, at least the relevant patent holder has promised to license at a reasonable and nondiscriminatory rate.

Hidden in that simple solution, of course, is enormous complexity. Is the RAND commitment a license, such that firms

4. See, e.g., FAIRFIELD RES. INT’L, *supra* note 2, at 1 (finding that only 28% of the patents declared essential to WCDMA are actually essential); Press Release, InterDigital, English High Court Rules that InterDigital European Patent (UK) 0,515,610 is Essential to the 3G UMTS WCDMA European Standard (Dec. 21, 2007), <http://ir.interdigital.com/releasedetail.cfm?ReleaseID=321938> (announcing the outcome of a major patent case where only one out of thirty-one supposedly essential patents was found to actually be essential).

5. Patent applications are not published during the first eighteen months of patent review unless the applicant affirmatively chooses to publish. 35 U.S.C. § 122(b) (2006).

6. Although RAND is the common acronym used in the United States, in Europe the relevant acronym is FRAND, which stands for “fair, reasonable and nondiscriminatory.” For purposes of this Lecture, I use the RAND formulation, but everything I say here is equally applicable to the FRAND variation.

7. See Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889, 1904–05 (2002) (reporting the results of a survey of patent policies adopted by standard-setting organizations). Note that an SSO might keep track not broadly of relevant patents, but more specifically of relevant claims within those patents.

8. Again, the requirement is typically more specific, for instance obligating the patent holder to make available any relevant claims, rather than the patent as a whole, and, at that, to make those relevant claims available for use within the standard but not necessarily for other projects. For clarity in the text, I put these details aside, as they do not alter my overall argument.

can go ahead and implement the technology subject only to a later obligation to negotiate the price? Is it a promise to license, which would mean that implementing firms in fact have no right to use the patented technology until they cut a specific deal? And what happens if, as seems enormously likely, an essential patent holder ultimately thinks one price is reasonable whereas the implementing firms think a much lower number is appropriate? Is that dispute a contract dispute, litigated using traditional contract damages measures, or a patent dispute, meaning that the patent system's damages regime controls?

In this Lecture, I set out to answer some of these fundamental questions. I begin in Part II by articulating four reasons why firms involved in the standard-setting process use RAND rather than explicitly negotiating price. My main point is that participating firms are attempting to delay price negotiation, but in a way that does not distort that negotiation when it ultimately does take place. In Part III, I build on that insight to advance two primary contentions. I argue that triple damages and injunctive relief are both inconsistent with the purpose of RAND, and thus patent holders should not be allowed to invoke those traditional patent remedies in the context of a RAND dispute. And I argue that, from an antitrust perspective, RAND's ambiguous language is actually something of a godsend, in that the ambiguity makes it harder for firms to use standard-setting as a cover for anticompetitive collusion. In Part IV, I consider alternative interpretations of RAND that would leave traditional patent law remedies more fully intact. Part V then briefly concludes.

One last word before I begin. I do not intend any of the remarks that follow to be controversial. The academics who have looked at RAND before me disagree about certain details of the analysis but most agree on the two big ideas that I also want to champion: RAND is a rejection of patent law's default damages regime, and RAND presents less of an antitrust problem than would explicit group pricing. My purpose in writing this Lecture, then, is to supplement that work from commentators like Anne Layne-Farrar,⁹ Mark Lemley,¹⁰ Joseph

9. See Anne Layne-Farrar, Gerard Llobet & A. Jorge Padilla, *Preventing Patent Hold Up: An Economic Assessment of Ex Ante Licensing Negotiations in Standard Setting*, 37 AIPLA Q.J. 445 (2009); Anne Layne-Farrar, A. Jorge Padilla, & Richard Schmalensee, *Pricing Patents for Licensing in Standard-Setting Organizations: Making Sense of FRAND Commitments*, 74 ANTITRUST L.J. 671 (2007).

10. See Lemley, *supra* note 7, at 1904, 1906; Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007); Mark A. Lemley, *Ten Things to Do About Patent Holdup of Standards (and One Not to)*, 48 B.C. L. REV. 149, 155 (2007) [hereinafter Lemley, *Ten Things*].

Miller,¹¹ Mark Patterson,¹² Carl Shapiro,¹³ and others.¹⁴ They have been leading the charge for years now. My contribution is to offer additional policy and intuitive explanations for why our view is right.¹⁵

II. WHY RAND

I want to start by thinking about RAND from a purely business perspective. That is, for the moment I want to put aside patent, contract, and antitrust law, and I want to focus instead on the business question of why firms might prefer the ambiguous RAND commitment over a more conventional,

11. See Joseph Scott Miller, *Standard Setting, Patents, and Access Lock-In: RAND Licensing and the Theory of the Firm*, 40 IND. L. REV. 351 (2007).

12. See Mark R. Patterson, *Antitrust and the Costs of Standard-Setting: A Comment on Teece & Sherry*, 87 MINN. L. REV. 1995, 1997 (2003); Mark R. Patterson, *Inventions, Industry Standards, and Intellectual Property*, 17 BERKELEY TECH. L.J. 1043 (2002).

13. See Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, in 1 INNOVATION POLICY AND THE ECONOMY 119 (Adam Jaffe et al. eds., 2000); CARL SHAPIRO & HAL R. VARIAN, *INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY* 229 (1999); Lemley & Shapiro, *supra* note 10.

14. See, e.g., Daniel G. Swanson & William J. Baumol, *Reasonable and Nondiscriminatory (RAND) Royalties, Standards Selection, and Control of Market Power*, 73 ANTITRUST L.J. 1, 5 (2005). For additional helpful links into the literature, see generally Layne-Farrar, Padilla, & Schmalensee, *supra* note 9, and Miller, *supra* note 11. Note that there is not universal agreement on the big points I set out to champion here. Damien Geradin, for example, dismisses policy analyses like mine as irrelevant academic theory. As he puts it, papers like this one “merely reflect[] policy preferences that may or may not be deemed in [the] future to have merit, but for which no historical consideration was given when most (F)RAND policies were adopted.” Damien Geradin & Miguel Rato, *Can Standard-Setting Lead to Exploitative Abuse? A Dissonant View on Patent Hold-Up, Royalty Stacking and the Meaning of FRAND*, 3 EUR. COMPETITION J. 101, 117–18 (2007); see Roger G. Brooks & Damien Geradin, *Taking Contracts Seriously: The Meaning of the Voluntary Commitment to License Essential Patents on “Fair and Reasonable” Terms* 2 n.7 (Mar. 12, 2010), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1569498 (making the same point). Geradin’s views have been influential, in part because he advised Qualcomm in what was the most high-profile RAND litigation thus far: that firm’s now-settled multi-jurisdictional conflict with Nokia. For background on the Qualcomm litigation with Nokia, see Don Clark, *Qualcomm’s Legal Battles Hold Big Implications for Cellphones*, WALL ST. J., Sept. 7, 2006, at B5.

15. My intended audience is the courts that will soon have to decide these issues. Patent holders sometimes recognize the constraints RAND imposes when they frame relevant patent cases. See, e.g., Complaint for Patent Infringement and Declaratory Judgment at 2, *Nokia Corp. v. Apple Inc.*, No. 1:2009cv00791 (D. Del. Oct. 22, 2009) (asserting infringement but pervasively recognizing the limitations associated with the RAND commitment). Sometimes, however, patent holders emphatically cross the line. See, e.g., Qualcomm Incorporated’s Brief in Opposition to Plaintiffs’ Motion to Dismiss and/or Stay and in Support of its Renewed Motion to Dismiss Plaintiffs’ Complaint at 39, *Nokia v. Qualcomm*, C.A. No. 2330-VCS (Del. Ch. Sept. 24, 2007) [hereinafter *Qualcomm Incorporated’s Brief*] (adopting an interpretation of RAND wholly inconsistent with my arguments about patent damages). My hope is that this Lecture will prove useful as additional courts confront these issues and thus need an accessible introduction to RAND and its implications.

explicit pricing term. The answer is not immediately obvious. After all, in most business settings, buyers very much want to know the prices associated with competing options so that they can ultimately make tradeoffs between price and quality. Yet, in standard-setting, that norm has been largely abandoned. Why?

One reason is that intricate negotiations over patent validity and patent value would take an enormous amount of time. To work through a process where dozens of companies would debate the merits and worth of hundreds of patents would take years. Worse, were consensus not achieved, litigation would run yet more time off the clock, with substantial time lost first at the district court and then on appeal. One charm of the RAND commitment for participants and the public alike, then, is that RAND allows technological implementation to move forward while the parties in parallel work out legal and financial details.

A second and related reason that firms opt for the RAND commitment is that standard-setting is a process run by engineers, not lawyers.¹⁶ A technology firm like Microsoft or Dolby can easily be involved in dozens of standard-setting processes at the same time. To send to each of those bodies not only the obviously necessary engineers but also an army of lawyers, business executives, and pricing specialists would be enormously expensive. The RAND commitment thus simplifies the conversation, allowing the engineers alone to run the show until the technical details are fully selected and documented.

A third reason that firms choose RAND is that many new technologies flop. Digital Audio Tape (DAT) technology for a time looked like it was going to be so important that Congress passed a set of laws specifically regulating its sale and use.¹⁷ Oops. Similarly, from 2002 through 2008, the HD-DVD standard was backed by industry heavyweights including Toshiba, Sanyo and NEC.¹⁸ Today, HD-DVD technology, too, is just a footnote in history.¹⁹ Thank goodness, then, that EMI,

16. Miller, *supra* note 11, at 369; Robert A. Skitol, *Concerted Buying Power: Its Potential for Addressing the Patent Holdup Problem in Standard Setting*, 72 ANTITRUST L.J. 727, 734 (2005).

17. I refer here to the now largely irrelevant Audio Home Recording Act of 1992, 17 U.S.C. §§ 1001–1010 (2006).

18. Tony Smith, *Toshiba Launches HD DVD Consortium*, REGISTER (Dec. 23, 2004) http://www.theregister.co.uk/2004/12/23/hd_dvd_promotion_group.

19. See, e.g., Henning Molbaek, *Breaking News: Toshiba Announces Discontinuation of HD DVD*, DVDTOWN (Feb. 19, 2008) <http://www.dvdtown.com/news/breaking-news-toshiba-announces-discontinuation-of-hd-dvd-businesses/5254> (announcing Toshiba's decision to stop producing HD-DVDs).

Sony BMG, Universal Music Group, Warner Music, Sony, Toshiba, Sanyo, NEC, Paramount, Hewlett Packard, Microsoft, Apple, and their peers did not each invest a fortune vetting those patent situations. They would have negotiated detailed terms for a group of patents that turned out to have little actual commercial value.

A fourth reason that firms opt for RAND—and this is in essence a more general version of reason three—is that RAND allows implementing firms to wait for additional information before they commit to a specific royalty structure.²⁰ When Al Gore invented the Internet,²¹ no one really understood the impact those protocols would have on commerce, culture and communication. Much the same, when the now-familiar 2G wireless standard was first promulgated, even that technology's strongest proponents could not have foreseen the degree to which cell phone usage would permeate both work and play. Financial arrangements will often be more efficient in the long run if their details can be negotiated after the negotiating parties more fully understand how the technology at issue is going to be used and by whom. The RAND commitment delays pricing negotiations and thereby allows at least some of that information to be included in the ultimate royalty negotiation.

None of this is meant to imply that a RAND-like approach was inevitable, or even that RAND is clearly the right way to go. My points about delay, failure, and the desirable absence of lawyers are all general arguments that could apply with comparable force in other settings. Businesses are routinely forced to delay the launch of products and services while they lawyer up their relationships and negotiate elaborate deals. And yes, many of those complicated deals ultimately prove worthless because consumers reject the resultant offering. Just the same, in many settings, delay would allow beneficial information to come to light—for instance, information about consumer preferences and the pace of market adoption. But businesses all the time enter into contracts anyway, allocating risk without knowing exactly what will happen next and sometimes making their various obligations contingent on future events. So, while these are all real problems to be sure, RAND is neither the only nor a necessary way to overcome them.

20. See Miller, *supra* note 11, at 369 (also pointing out this benefit of delay).

21. Just teasing. See Richard S. Whitt, *Adaptive Policymaking: Evolving and Applying Emergent Solutions for U.S. Communications Policy*, 61 FED. COMM. L.J. 483, 548 (2009) (discussing how former Vice President Al Gore was wrongly accused of having himself claimed to “invent” the Internet).

Moreover, RAND has some real drawbacks. Consider, for instance, the fact that the RAND commitment separates the negotiation over the details of a technology from the negotiation over its cost.²² At my house, that would be an obvious and unacceptable blunder. I can only imagine what my wife would say were I to choose an expensive piece of home electronic equipment—say, a new flat-screen television—without having an estimate of what that hardware and its accessories would ultimately cost. Yet sophisticated companies like Nokia, Ericsson, Nortel, Sony, InterDigital, Texas Instruments, Alcatel, DirecTV, and NEC did exactly that when they hammered out the details of the recently launched Long Term Evolution (LTE) telecommunications standard.²³ They made hundreds of nuanced choices about how LTE-compliant devices will decode, encode, and transmit data, but they did so without any real understanding of what the various options would cost in terms of patent fees. That sort of economic blindness is par for the course in the standard-setting process. But it is still jarring, and it still represents a real downside to the RAND approach.²⁴

As I will discuss more fully later in the Lecture, RAND has another significant drawback as well: it forces courts to take a more active role when it comes to pricing patents. Judges and juries are unlikely to be very good at valuing patented inventions. This would be true in even a simple case where a single patent was at play; but it is all the more true in the context of standard-setting, where the value of any one patent has to be judged in light of hundreds or even thousands of other necessary patent rights. An explicit pricing regime would address

22. Miller, *supra* note 11, at 364–67.

23. *The Mobile Broadband Evolution: 3GPP Release 8 and Beyond HSPA+, SAE/LTE and LTE-Advanced*, 3G AMERICAS, 16 (Feb. 2009), http://3gamericas.org/documents/3GPP_Rel-8_beyond_02_12_09.pdf.

24. For discussion, see Skitol, *supra* note 16, at 733–35. In reality, of course, complete price comparisons are impossible, because there will almost always be patents that are unknown at the time the standard is developed. A patent application might still be pending, for example, or the relevance of an issued patent might not be recognized at the time. Indeed, patent holders have an incentive to lay low during the standard-setting process in order to avoid being asked to undertake the RAND commitment. If I have a relevant patent and I can manage to go undetected during the standard-setting process, I can later assert my patent full-force against implementing firms. Thus, the real price of any chosen technology cannot be known ahead of time no matter whether RAND or explicit pricing is used. Known patents could be priced, but unknown patents would always remain as pricing wildcards. See Miller, *supra* note 11, at 369; see also Doug Lichtman, *Patent Holdouts in the Standard-Setting Process*, IP CENT. ACAD. ADVISORY COUNCIL BULL. 1.3, May 2006, at 3–10, available at <http://www.pff.org/issues-pubs/ip/bulletins/bulletin1.3patent.pdf> (discussing the patent doctrines that make this sort of strategic behavior possible).

this difficulty: standard-setting participants would negotiate each patent's appropriate price, and courts would be asked only to enforce the agreed-upon deals. The RAND commitment, by contrast, puts courts center stage. If the parties cannot agree as to what "reasonable" means, a judge or jury will ultimately have to wade through the evidence and pick a number. Moreover, even if the parties in the end agree on what "reasonable" means, their agreement will unavoidably have been influenced by what each party expected a court would do if agreement had not been reached. RAND, then, takes a task that courts perform poorly and makes that task a central driver in the ultimate economic interaction.

All that said, however, the RAND commitment is, as of this writing, widely used in settings where a large number of patents are plausibly implicated by a given technological standard. It might be a good idea. It might be a terrible one. But RAND is today pervasive, and as such it is inevitable that courts will at some point have to interpret its meaning. It is to that topic that I now turn.

III. INTERPRETING RAND

It is something of an outrage that the language of the RAND commitment offers so little guidance as to its proper interpretation. What is "reasonable" and how does use of that word compare to patent law's use in the context of "reasonable" royalties? The standard RAND clause does not say.²⁵ Does "nondiscriminatory" mean that prices must be the same across the board, or does it mean that some degree of price differentiation is fine but differences keyed to certain distasteful characteristics—*discrimination*—are verboten? I suspect the latter, but, again, the standard clause does not elaborate. Bad enough if this sort of ambiguity had shown up in some private contract governing an interaction of modest economic and cultural import. But the RAND commitment governs patent rights in a breathtaking array of familiar industries and technologies, and in the end it will serve to allocate multiple billions of dollars between and among major firms.

Courts might be tempted to punish this ambiguity by interpreting the commitment to be meaningless, nonbinding, or otherwise ineffective.²⁶ Such an approach would pressure firms in

25. See Lemley, *supra* note 7, at 1906 ("While reasonable and non-discriminatory licensing thus appears to be the majority rule . . . relatively few [standard-setting organizations] gave much explanation of what those terms mean . . .").

26. There was a time when incomplete contracts were routinely deemed unenforceable, typically on the ground that the indefinite term was evidence that the

the future to draft contract language with more precision, in essence implementing the Ayres/Gertner “penalty default” concept.²⁷ That, however, would be a mistake. Yes, looking forward, standard-setting organizations ought to supplement the traditional RAND language with more specific information about exactly what the clause means. And one can easily imagine a future RAND clause that reads, say, “reasonable and nondiscriminatory, by which we mean that the patent holder has no right to an injunction” or “reasonable and nondiscriminatory, by which we mean to endorse patent law’s traditional *Georgia Pacific* factors.”²⁸ But for the RAND commitments already in place, courts are stuck with only two choices: interpret the clause in light of its likely purpose, or strip it of meaning and in that way throw into turmoil the economics that undergird countless important consumer technologies. I myself favor the former approach, and so here I consider from three perspectives how RAND likely ought to be read.²⁹

A. *The Economic Perspective*

From an economic perspective, the purpose of the RAND commitment is to ensure that patent holders are not able to earn exaggerated royalties merely because price negotiations have been delayed.³⁰ Without some sort of pricing commitment, this is exactly

parties had not in fact reached agreement. The modern approach, however, is to allow courts to enforce incomplete contracts by filling in missing details. For discussion and analysis, see Omri Ben-Shahar, “*Agreeing to Disagree: Filling Gaps in Deliberately Incomplete Contracts*,” 2004 WIS. L. REV. 389, 393–94.

27. Ian Ayres & Robert Gertner, *Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 YALE L.J. 87, 97 (1989).

28. See *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970) (articulating the now-famous list of considerations relevant to the calculation of a reasonable patent royalty).

29. It is striking that, despite all of the problems with the RAND commitment, there have been very few court cases specifically addressing its meaning. Given how frequently this language is used and how ambiguous its meaning is, one would have thought that litigation about its proper application would be common. Yet, to date, there have been only a handful of cases. This might be a sign that RAND in fact works. I worry, however, that it is instead a sign that licensees are paying excessive royalties rather than fighting what would be messy court fights. That said, the paucity of litigation is an important real-world fact, and one that deserves further attention.

30. This is a standard point. See, e.g., Swanson & Baumol, *supra* note 14, at 10 (“[T]he primary goal of obtaining RAND licensing commitments is to prevent IP holders from setting royalties that exercise market power created by standardization . . .”); Miller, *supra* note 11, at 363 (“[M]ost who have analyzed the RAND promise’s meaning expressly describe it as a mechanism that should prevent a participant-patentee from using an injunction threat to hold up the adopter community for disproportionate royalty payments.”). I should point out that RAND obviously accomplishes more than just this. For instance, RAND ensures that a patent holder will in fact license, rather than keep his patented technology exclusively for himself; and RAND also ensures that licenses will be

what would happen. The price for any technology included in the standard would go up simply because it was chosen.³¹ That is emphatically not the point of RAND. Standard-setting participants defer pricing negotiations because they want more information, or because they want to implement the relevant standard more quickly, or because they want to minimize upfront costs. But it seems implausible to think that standard-setting participants opt for RAND in order to randomly and artificially increase each patent holder's ultimate leverage.

To see this point more fully, consider a situation in which two comparable technologies are vying for inclusion in a given standard: Dolby's high-fidelity audio compression codec on the one hand and DTS's rival audio compression technology on the other. Were prices being negotiated at the time of the selection, participants in the standard-setting process would compare the Dolby and DTS approaches. They would identify advantages and disadvantages, and they would ultimately offer the winner a price that reflected its marginal value as compared to the unsuccessful alternative. If the winning patent holder were to hold out for more, standard-setting participants would presumably threaten to switch to the second-best technology. Ultimately, a competitive bidding process would typically yield something close to the efficient price.³²

Now consider what would happen if, instead of negotiating at the time of selection, standard-setting participants were to wait and negotiate a few years later. Two important considerations would by then have changed. First, a given licensee would by that point likely have made some technology-specific investments. The firm will have designed its products. It will have built manufacturing facilities. It will have made commitments to buy components from its suppliers. And it will have promised

offered in a largely unbiased way, rather than with terms that strongly favor one licensee over another.

31. The only possible exception to this statement would involve a case where, even after formal adoption, no firm invested in the standard prior to negotiating price. Put differently, if there is any patent-specific investment made by any firm, the relevant patent holder will be able to charge a higher price after standardization than he could have charged before. For the explanation, keep reading.

32. None of this is to rule out the possibility that some technologies are unique and thus would not be substantially constrained by *ex ante* competition. If there were only one way to encrypt data for cellular transmission, for instance, the patent covering that technology would be worth a fortune no matter when its value was determined. Thus, when I refer to a competitive price, I mean only to refer to the price that would be assigned at a time prior to standardization. That price might be low. It might be high. But it would reflect the value inherent to the technology rather than the value created by the decision to standardize.

relevant functionality to downstream customers. A patent holder would be able to take advantage of all of those commitments, demanding a royalty that reflected not only the value of the patented technology as compared to next-best alternatives, but also the value that this licensee would place on avoiding disruptions to its already-made investments.³³

Second, even if a particular would-be licensee has not made patent-specific investments, its peers will have—and that triggers a similar dynamic. Consider standards with respect to driving. Before driving norms were established, the value of “driving on the left” was roughly equal to the value of “driving on the right.” Everyone surely agreed that all the drivers in any particular region ought to adopt the same default rule; but the choice between the two was likely a draw, and thus patents related to either one would have been of similar value. Once a great deal of traffic had opted for the right, however, the economics changed. A patent related to the idea of driving on the left was worth very little. A patent related to the idea of driving on the right was worth a fortune. The change had nothing to do with the relative merits of these two technologies. It was just an example of a more general phenomenon associated with standardization: patents related to a chosen standard increase in value as more people adopt the standard.³⁴ This is then another problem with delayed patent negotiations. Patent holders who negotiate after standardization are able to charge prices that reflect the now-realized network value, in essence charging licensees for the fact that other licensees are already committed.³⁵

33. This, too, is a standard point. See, e.g., Lemley, *Ten Things*, *supra* note 10, at 153–54; Swanson & Baumol, *supra* note 14, at 10. Interestingly, if several patent holders each attempt to extort this kicker, they might in the end have to divide up its value. Suppose, for instance, that a producer would need to shut its plant for six months in order to change its hardware configuration. If one patent holder threatens to cause that disruption, that patent holder can demand a share of the value associated with avoiding a six-month delay. But if two patent holders each threaten to cause that disruption, each can demand at most half of the value of a six-month delay. Ask for more in the aggregate, and the producer will be better off undertaking the disruption and paying neither patent holder’s ransom. For a perhaps overly optimistic discussion of this dynamic, see Lichtman, *supra* note 24, at 10–11.

34. The only exception here would be a case where the choice was inevitable, for instance because as a practical matter only one standard was possible in the first place. In such a case, the value of the patented technology might not increase by virtue of being chosen because that value was by assumption inherent already. For a fuller discussion of this issue and of network effects more generally, see Stanley M. Besen & Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, 8 J. ECON. PERSP. 117 (1994); Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985); and Michael L. Katz & Carl Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 J. POL. ECON. 822 (1986).

35. The fact that a technology was chosen for a standard might increase the value ascribed to that technology in other ways as well. For instance, because standard-setting

From an economic perspective, then, the important work of the RAND commitment is to minimize these economic distortions.³⁶ Participants in the standard-setting process might well intend to pay patent holders the royalties they would have gotten had sufficient time, cash, and predictive information been available so as to enable complete negotiation *ex ante*. And participants in the standard-setting process might also intend to pay each patent holder a bit extra as thanks for that patent holder's willingness to delay the price negotiation and in that way reduce the costs associated with the standard-setting process.³⁷ But there is no reason to believe that standard-setting participants also mean to allow patent holders to hold hostage each participant's standard-specific investments, or to allow patent holders to arrogate to themselves the value created from the group's standardization effort.

B. The Patent Law Perspective

From a patent perspective, the purpose of the RAND commitment is to reject patent law's default damages regime. Patent law, it turns out, does not award "reasonable" royalties. Quite the opposite, when a court decides that a valid patent has been infringed, the court typically imposes a remedy the net value of which clearly exceeds the value of any deal the parties would have made had they negotiated a license prior to the infringement. This exaggeration is explicit and intentional. But, with just one exception, the reasons for it do not apply in the RAND context.

typically involves robust testing and certification procedures, selection of a given technology often acts as a credible endorsement of that technology's efficacy. Selection might also create a focal point, helping one technology stand out from the others in the mind of consumers or downstream producers. *See* Swanson & Baumol, *supra* note 14, at 8–9 (discussing these and related theories).

36. *See, e.g.,* SHAPIRO & VARIAN, *supra* note 13, at 241 ("Reasonable *should* mean the royalties that the patent holder could obtain in open, up-front competition with other technologies, not the royalties that the patent holder can extract once other participants are effectively locked in to use technology covered by the patent."); *see also* Swanson & Baumol, *supra* note 14, at 10 ("If the primary goal of obtaining RAND licensing commitments is to prevent IP holders from setting royalties that exercise market power created by standardization, then the concept of a 'reasonable' royalty . . . must be defined and implemented by reference to *ex ante* competition . . .").

37. Participants in the standard-setting process have a strong incentive to treat participating patent holders well because otherwise patent holders might refuse to participate in the process. The costs there would be substantial: either the relevant technologies would not be able to be used, or the technologies would be used but then the patent holders would be able to charge unconstrained, not-so-reasonable prices. *See* Geradin & Rato, *supra* note 14, at 125.

1. *The General Case for Exaggeration.* One reason patent law intentionally exaggerates is that exaggeration encourages private parties to negotiate rather than litigate. The mechanism here is obvious: an infringer who knows that litigation will yield exaggerated liability has strong incentives to avoid litigation. This is good public policy primarily because judges and juries are not well equipped to value patented inventions. True, they might be able to make educated guesses based on the evidence presented; and they might even be as likely to overestimate as they are to underestimate. But, in any specific dispute, there is little reason to believe that judges and juries will come up with even a remotely accurate estimate for the value of the patent at issue.

Private negotiation, by contrast, can be reliable so long as private negotiation takes place before the would-be infringer has made any investments that are specifically tied to the patented technology.³⁸ In those circumstances, the negotiation between the patent holder and a potential infringer resembles a competitive interaction. The patent holder can ask for a high starting price; the potential infringer can counter by pointing to potential substitute technologies; and ultimately the process should yield a price that accurately reflects the marginal advantages of the patented technology.

Exaggeration thus can serve a useful purpose. Whenever infringers are able to negotiate prior to making any patent-specific investments, exaggeration helpfully increases their desire to do so. The net result is a patent system where patents are more likely to be priced in the private market, and courts can therefore avoid the difficult task of valuing patented inventions themselves.

The second justification for patent law exaggeration derives from the concern that, without exaggeration, infringers would have a strong incentive to hide their illegal activity instead of addressing it. My remarks thus far already speak to this

38. My words are carefully chosen in the text, because stronger statements—say, “private negotiation is reliable so long as the negotiation takes place before the would-be infringer has made any patent-specific investments”—are simply not true. Recall, for instance, my example about the norms related to driving on the right side of the street. In that context, even if an accused infringer had not invested prior to negotiation, the negotiation would still be skewed if a substantial number of other firms had already invested. This is increasingly a problem for the patent system. The patent system’s core assumption about the efficiency of private market transactions might have been valid in a world where products were typically covered by one and only one relevant patent, and a world where network externalities were not of significant economic import. But the modern world does not remotely meet either of those conditions, and that is one of many reasons why the patent system today is troublingly out of kilter.

concern in part. My first justification for exaggeration was that it creates an incentive for an infringer to negotiate prior to making patent-specific investments. Obviously, to negotiate, an infringer will have to identify himself to the patent holder, and thus an incentive to negotiate is simultaneously a disincentive to hide. But hiding is a bigger issue than just that. Consider, for instance, an infringer who neither knew nor could have known about a patent prior to making patent-specific investments. If this infringer later discovers the patent, he will be reluctant at that point to contact the patent holder and negotiate, because then the patent holder will hold hostage the infringer's already-made investments. Worse, this infringer will have an affirmative incentive to keep quiet. After all, the patent holder might never even notice the infringement and hence, if the infringer keeps his head down, he might never have to pay. The patent system on these facts faces a real challenge: the system needs to create an incentive for the infringer to identify himself, but at the same time it needs to protect him from an undesirable hostage situation.³⁹

Exaggerated damages can solve this problem. Where there is evidence that the licensee reasonably could have stepped forward but chose not to, patent law can punish that choice by exaggerating.⁴⁰ The infringer would suffer because of his decision

39. Although this Lecture is not the place to explore the issue fully, I cannot help but point out another possible solution to this problem: deem the infringer's use of the invention perfectly legal. On the facts I sketch above, the accused infringer independently invented the patented invention. He did not copy it from the patent holder, he did not know about the patent itself, and he could not have discovered the patent had he engaged in reasonable efforts to find it. In that situation, patent law could in theory declare independent invention to be a complete defense to patent infringement. The patent system exists to reward patent holders for bringing inventions into meaningful public use, either through their own efforts or through proactive licensing. Here, the patent holder did no such thing, and the patent system could take that into account by refusing to recognize infringement. Many details of modern patent law would have to change in order to implement this sort of proposal in a way that continues to properly reward patentees for their accomplishments. For now, I only want to flag the concern. Defenses related to independent invention strike me as the most important next step in patent reform. They could pressure inventors to work harder at bringing their ideas to the public, and they could become an objective measure of whether a given invention actually was obvious—and hence unworthy of patent protection—at the time it was purportedly invented. For some provocative discussions along these lines, see Tun-Jen Chiang, *A Cost-Benefit Approach to Patent Obviousness*, 82 ST. JOHN'S L. REV. 39, 67 & n.120 (2008).

40. See Roger D. Blair & Thomas F. Cotter, *An Economic Analysis of Damages Rules in Intellectual Property Law*, 39 WM. & MARY L. REV. 1585, 1640 (1998) ("Some enhancement of the patentee's [damages] award . . . may be necessary to deter those infringers who know about the patent, or who could learn about it at a reasonable cost, but whose conduct otherwise might go undetected or undeterred."). Interestingly, there are parallel doctrines that are designed to encourage patent holders to step forward and identify themselves in instances where they know some third party is infringing. The

to hide, and in the long run that would encourage infringers in similar situations to step forward. By contrast, in cases where the licensee does step forward, patent law can promise to take its thumb off the scale, calculating royalties with an eye toward the royalty the parties would have struck had they been able to strike a deal before the infringer first invested. The parties would then hopefully foresee that evenhanded result and negotiate in its shadow. But the key point is that the backstop to their negotiation would be the threat of a truly reasonable royalty and not the threat of either a hostage-taking situation or exaggerated court remedies.⁴¹

The third justification for patent law exaggeration is simply this: exaggeration is the way the patent system accounts for changes in patent uncertainty. Prior to litigation, there is almost always some uncertainty as to whether the patent at issue is valid, whether the patent at issue actually has been infringed, or both. That is, the accused infringer might plausibly argue that the patent should never have been issued, and the accused infringer might similarly argue that its technology is not covered by the patent's claims. Litigation resolves the uncertainty. Thus, when a patent holder prevails, the damages awarded naturally are higher than the royalties the parties would have negotiated prior to verdict. Negotiated royalties reflect uncertainty; court-determined royalties do not. Think of it this way: if prior to litigation a patent holder and a would-be licensee both agree that there is a 50% chance that the asserted patent is invalid, their private deal would reflect those doubts. The licensee would demand a discount as compared to a sure-thing royalty, and the patent holder would accept that discount in

doctrine of laches serves this purpose, for example, in that it stops a patent holder from collecting backward-looking damages in instances where the patent holder unreasonably delayed in bringing suit and the delay resulted in material prejudice to the accused infringer. *See Gasser Chair Co. v. Infanti Chair Mfg. Corp.*, 60 F.3d 770, 773 (Fed. Cir. 1995), *vacated on other grounds*, 95 F.3d 1165 (Fed. Cir. 1996). Similarly, the Patent Act encourages patent holders to step forward by refusing to award damages for any infringement that took place more than six years prior to the filing of the complaint. *See* 35 U.S.C. § 286 (2006). I am skeptical as to how effective these provisions are in practice, but it is interesting to see how these doctrines parallel the exaggeration doctrines discussed in the text.

41. Exaggeration and hostage-taking are different in that one is calibrated by legal doctrines while the other is random. That is, when patent law is the source of the exaggeration, courts are in theory actively choosing the degree of exaggeration by (say) calibrating the relevant injunction or specifying whether damages ought to be doubled or tripled. In hostage-taking, by contrast, the extent of any overpayment turns on a number of arbitrary factors, including the amount the infringer has already invested in the patented technology and the number of other patent holders who are able to hold hostage that same sunk investment.

order to avoid the risk of a bad outcome. If that patent holder ends up successfully litigating the issue, however, the resulting court-ordered royalty should no longer reflect that 50% discount. Had the patent holder lost the case, he would have earned nothing. Given that he won, he should correspondingly earn the undiscounted award. Intuitively, that's what it means to take the risk of actually litigating the issues.⁴²

2. *How Patent Law Exaggerates.* There are many patent doctrines that implement patent law's exaggeration approach. These doctrines largely track the policy intuitions sketched above. An obvious example is the rule with respect to willful infringement. Under current law, if an infringer knew or should have known about a patent, and if that patent's validity and relevance is objectively clear, then the court can use its discretion to award up to triple damages.⁴³ The logic is that, on those facts, the infringer was presumably in a great position to seek out the patent holder and negotiate a license prior to the infringement. The infringer knew or should have known about the patent; and the infringer should have paid up because the patent was so clearly valid and infringed. Courts therefore are empowered to triple the damages, thereby encouraging negotiation in similar future situations.⁴⁴

Another way patent law implements its exaggerated damages regime is through the system's willingness to issue injunctions against future infringement.⁴⁵ When a patent holder wins an infringement case, the patent holder typically requests not only cash for infringement that has already occurred, but also an injunction barring future infringement. The idea is that the injunction will force the infringer to negotiate with the patent holder, and thus the private parties will set their own forward-looking royalty rather than relying on the judge or jury

42. See Roger D. Blair & Thomas F. Cotter, *Rethinking Patent Damages*, 10 TEX. INTELL. PROP. L.J. 1, 40–42 (2001) (discussing this sort of risk analysis and its possible exceptions).

43. See *In re Seagate Tech., L.L.C.*, 497 F.3d 1360, 1377, 1381 (Fed. Cir. 2007) (Gajarsa, J., concurring) (articulating the modern willfulness doctrine).

44. Discretion is an important part of the doctrine because willful damages are inappropriate in some instances where the formal test is nonetheless met. For instance, sometimes an infringer will hear of an obviously valid patent only after the infringer has made patent-specific investments. If the infringer were at that point to reach out to the patent holder, the patent holder would attempt to hold those investments hostage. Willful damages ought not punish the infringer for turning down that distorted deal. Quite the opposite, when faced with that situation, it is reasonable for an infringer to ask the court for an impartial valuation, rather than simply paying a clearly exaggerated royalty.

45. See 35 U.S.C. § 283 (2006) (authorizing courts to grant injunctions in patent cases).

to do so.⁴⁶ That negotiated royalty will be exaggerated, however, because of the sunk cost problem discussed earlier.⁴⁷ A firm that has already begun to use what turns out to be an infringing technology will typically also already have made investments specific to that technology. The firm's manufacturing facilities will already be tailored to produce the infringing component. The firm's contracts with its suppliers and its customers will already be tethered to that and not some other technical approach. As a result, the infringer will be willing to overpay for the technology, paying the intrinsic value of the technology as compared to its next-best substitute plus a kicker that reflects the savings associated with not having to change its production facilities or in other ways disrupt existing business relationships and practices.⁴⁸

A third way patent law exaggerates is through a false assumption that is nevertheless routinely employed in damages analysis. When a patent holder sues for damages, he can request that a "reasonable royalty" be determined through what is known as a "hypothetical negotiation" framework. As explained by the courts, the hypothetical negotiation simulates the conversation that the infringer and the patent holder would have had if they had negotiated prior to the first act of infringement.⁴⁹ The courts endeavor to run the simulation accurately, even going so far as to consider only information that was actually available at the time the negotiation would have occurred.⁵⁰ But courts then make one initially surprising move: they assume that both parties involved in the negotiation believe the patent to be valid and infringed.⁵¹

46. Sometimes, of course, the patent holder is not interested in negotiating at all, preferring instead to bar infringement and thus limit the number of firms using the invention.

47. See *supra* Part III.A.

48. The Supreme Court's recent decision in *eBay, Inc. v. MercExchange, L.L.C.* helps to check this form of exaggeration because a defendant in this position could convince the court that, under the *eBay* test, an injunction ought not issue. The court would then itself impose a forward-looking royalty that would not take into account patent-specific sunk costs. The law here is not sufficiently developed to know for sure whether that sort of argument will carry the day, but *eBay* at least opens the door. See *eBay, Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006).

49. See, e.g., *Radio Steel & Mfg. Co. v. MTD Prods., Inc.*, 788 F.2d 1554, 1557 (Fed. Cir. 1986) (explaining the hypothetical negotiation framework). Note that this approach inherently exaggerates, in that the value of the technology would be more accurately represented by the royalty the parties would have chosen had they been able to negotiate before the infringer made any patent-specific investments. Courts, however, mistakenly run the analysis at the time of the first infringement.

50. See, e.g., *Riles v. Shell Exploration & Prod. Co.*, 298 F.3d 1302, 1313 (Fed. Cir. 2002) ("A reasonable royalty determination for purposes of making a damages evaluation must relate to the time infringement occurred, and not be an after-the-fact assessment.").

51. See Robert Goldscheider, *The Employment of Licensing Expertise in the Arena of Intellectual Property Litigation*, 36 IDEA 159, 174 (1996) ("Underlying the entire process

In reality, of course, there would almost always have been doubt. But this false assumption is made for the reason I discussed above: a patent holder whose patent survives litigation must be compensated for having incurred that risk, and so the royalty calculation made after verdict must build patent validity and infringement into the math.⁵²

3. *Exaggeration and RAND.* Reasonable minds can disagree over whether these various exaggeration techniques are in the end an effective way to address the public policy concerns that justify them. My own view is that these doctrines need to be more explicitly tied to their underlying policy goals, because today patent holders seem to abuse these rules by invoking them in situations where they ought not apply. For the purposes of this Lecture, however, my point is more narrow. Whatever its merits in general, exaggeration like this is for the most part inappropriate as applied to patents covered by the RAND commitment.

The first policy consideration, the idea of encouraging negotiation prior to investment, is clearly inapt. The whole purpose of the RAND commitment is to allow patent holders and would-be infringers to delay negotiation. Yes, one consequence of that delay is that infringers and patent holders both miss out on the chance to negotiate prior to investment. And that is a real cost to the system: private negotiation prior to investment is surely a more accurate means by which to establish patent value than are alternatives like private negotiation after investment or explicit court determination. However, that is the choice RAND embodies. Thus, to the extent the RAND commitment is going to be enforced—and I have argued that it should be, at least with respect to deals already in place⁵³—it makes no sense to impose exaggerated damages to punish the very delay RAND set out to accomplish.

The second policy consideration—the concern about undetected infringement—also resonates poorly in the RAND context. Patent holders in conventional settings find it difficult to identify infringers because infringers tend not to speak up. Moreover, infringing products and processes can be hard to reverse engineer, and that too makes detection by the patent holder difficult at best. In the RAND context, however, these problems are either fully eliminated or substantially reduced. For one thing, participants in the

within the scope of the hypothetical negotiation is the assumption that the patent involved is accepted by both parties as being valid and enforceable.”).

52. See *supra* Part III.B.1.

53. See *supra* note 29 and accompanying text.

standard-setting process identify themselves publicly. No hiding there. Similarly, firms that produce products or implement processes consistent with a standard also typically self-identify. They label their products as standard-compliant, or the fact of standard compliance is obvious upon even casual inspection. Admittedly, that still leaves some special cases where the infringer's economic footprint might be so small that it goes unnoticed, or where the use of a particular standard is not evident on the face of the relevant product or process. Still, for the most part, detection is not a significant problem in the typical RAND setting and hence, when interpreting RAND, damages exaggeration cannot be readily justified on that ground.

That leaves only the third policy consideration, the one keyed to patent uncertainty—and good thing. Patent uncertainty in the context of the RAND commitment plays out exactly the same way as it plays out in conventional patent settings. Prior to verdict, a potential licensee will offer a royalty that discounts for the fact that the patent rights are uncertain. After verdict, however, that uncertainty is resolved and the royalty should adjust accordingly. Indeed, the system would not work otherwise. Suppose that a patent holder and a would-be licensee both thought that there was a 25% chance that the patent at issue was valid. If at the end of litigation the court awarded only 25% of the sure-thing royalty, the entire negotiation dynamic would unravel. Prior to verdict, the would-be licensee would argue that the patent holder has only a 25% chance of winning and, at that, will win only 25% of the sure-thing royalty. Thus the licensee would rationally offer a paltry 6.25% of patent value, in essence wrongly double-counting the 25% discount. Exaggeration is thus still necessary with respect to patent uncertainty, even under RAND.⁵⁴

Where does all that leave us? Injunctive relief primarily serves the first policy consideration and willful damages primarily serve the second.⁵⁵ Both of these measures of patent damages should therefore be off the table in the RAND context. The exaggeration inherent in the reasonable royalty framework,

54. See Brooks & Geradin, *supra* note 14, at 17 (“After a patent has been tested and the uncertainty eliminated, then what is ‘fair and reasonable’ no longer needs to include any ‘uncertainty discount,’ and should be substantially *higher* than would have been the case pre-litigation.”).

55. Courts are typically not explicit about these policy considerations, and thus injunctive relief and willful damages are sometimes used even in instances where policy considerations do not justify the practice. However, the rules about injunctive relief and willful damages are both very much in play today thanks to the recent *eBay* and *Seagate* decisions, and thus I am optimistic that both doctrines will increasingly be applied in ways that match their underlying policy purposes. See *supra* notes 43–44 (discussing *Seagate*) & 48 (discussing *eBay*).

by contrast, primarily serves the third policy consideration and hence that exaggeration ought to survive.

There are several plausible ways to achieve these outcomes. Courts could interpret RAND as a public commitment that creates a defense of equitable estoppel.⁵⁶ Under that estoppel, the patent holder would be deemed to have permanently waived his right to seek triple damages or to ask for injunctive relief, but would otherwise be allowed to invoke patent law's damages regime. Courts could just as well interpret RAND as creating an implied license, with the license rendering moot any claim to injunctive relief or triple damages, but leaving the court with the power to determine the royalty due.⁵⁷ I do not mean to choose between these and other options here. I only want to emphasize that, no matter what doctrinal lens courts apply, the goal should be to trim patent law's damages regime such that the damages awarded ultimately approximate the royalty the parties would have negotiated prior to standardization plus a kicker for the now-resolved uncertainty.⁵⁸

56. Equitable estoppel is typically understood to bar any form of prospective relief including damages. *See, e.g., Jamesbury Corp. v. Litton Indus. Prods., Inc.*, 839 F.2d 1544, 1554 (Fed. Cir. 1988), *overruled on other grounds by A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020, 1042 (Fed. Cir. 1992) ("Estoppel prevents the patent owner from obtaining prospective relief, either an injunction or damages for infringement occurring after the filing of suit."). However, because the doctrine is an equitable rule, courts retain substantial discretion to tailor the estoppel to the facts at hand. *See A.C. Aukerman Co.*, 960 F.2d at 1041 (asserting that equitable estoppel falls within the "sound discretion of the trial court" and is not controlled by particular factual circumstances or set rules). *But see Lemley, supra* note 7, at 1923 (expressing skepticism as to whether estoppel can apply in this context, primarily because estoppel typically has been invoked only in instances where a patentee has "induced others to believe it will not enforce the patent").

57. This is Lemley's preferred solution. *Lemley, supra* note 7, at 1924–26.

58. In addition to all of the above, there is one other aspect of patent law's default damages regime that seems inconsistent with at least some implementations of the RAND commitment. That inconsistency has to do with the use of information that was not available at the time of the first infringement. As I mentioned above, one framework used to calculate patent damages is the fiction of a hypothetical negotiation. The hypothetical is typically run using only information that would have been available prior to the first act of infringement, and courts explicitly disregard information about what actually transpired if it is inconsistent with then-current projections about what would transpire. *See, e.g., Unisplay, S.A. v. Am. Elec. Sign Co.*, 69 F.3d 512, 518 (Fed. Cir. 1995). That is a plausible approach for a conventional patent case, in that conventional cases aspire to put both parties back into the positions they would have been in had they negotiated on time. However, such an approach is inconsistent with RAND in instances where the motivation for leaving price ambiguous was precisely to allow for new information to come to light and influence the royalty structure. That said, patent courts do already from time to time deviate from the standard approach, and RAND could therefore easily become a new court-made exception to the default. *See, e.g., Fromson v. W. Litho Plate & Supply Co.*, 853 F.2d 1568, 1575 (Fed. Cir. 1988), *overruled on other grounds by Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337 (Fed. Cir. 2004).

C. *The Antitrust Perspective*

In *The Wealth of Nations*, Adam Smith famously warned that “[p]eople of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.”⁵⁹ There is a substantial truth to that warning, and as a result antitrust authorities have been understandably skeptical of the entire standard-setting process. Yes, in some instances, overall efficiency can be significantly enhanced if erstwhile competitors are allowed to together agree on the fundamental rules for a new product or technology. Intuitively, the market for electrical appliances would be substantially burdened if, say, Black & Decker power tools required a rectangular outlet whereas Dell computers worked only with a round one. But coordination can also lead to inefficient, anticompetitive outcomes. Under the guise of the standard-setting process, firms can collude with respect to downstream prices, using patent cross-licenses to lock in uniform, minimum numbers. Firms similarly can use standard-setting to effectuate a buyer’s cartel through which participating firms are able to target some third party’s technology, refusing to pay more than a given, coordinated amount, if any amount at all.⁶⁰

When it comes to RAND pricing, however, the relevant question is a different one. The question relevant for RAND is not whether standard-setting processes promote or undermine competition. The question is whether competition is better served by a process where the standard-setting body publicly negotiates prices ahead of time as a group, or by a process where the standard-setting body uses RAND as a means by which to defer pricing details to later private, bilateral negotiations.

That last phrase is important. The RAND commitment is itself only a first step toward establishing patent prices. After a standard has been promulgated, firms that wish to invoke the RAND commitment must still contact the relevant patent holders and negotiate their own bilateral deals. Those contracts

59. 1 ADAM SMITH, *THE WEALTH OF NATIONS* 207 (P.F. Collier & Son 1902) (1776).

60. There is a vast literature exploring various antitrust objections to standard-setting in general and price coordination in particular. See, e.g., 2 HERBERT HOVENKAMP ET AL., *IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW* § 35.5 (2d ed. 2010); Michael G. Cowie & Joseph P. Lavelle, *Patents Covering Industry Standards: The Risks to Enforceability Due to Conduct Before Standard-Setting Organizations*, 30 *AIPLA Q.J.* 95, 102 (2002); Skitol, *supra* note 16; Patrick D. Curran, Comment, *Standard-Setting Organizations: Patents, Price Fixing, and Per Se Legality*, 70 *U. CHI. L. REV.* 983, 998 (2003).

are where “reasonable” and “nondiscriminatory” are translated into dollars and cents, and those deals are typically confidential documents seen only by the specific patent holder and the corresponding patent licensee. Thus any risk of anticompetitive collusion drops sharply. When Nokia was negotiating the specifics of its patent license with Qualcomm, for example, Nokia had every incentive to fight tooth and nail for a low rate. It did not matter if (say) the group had hoped that its members would unlawfully conspire to keep prices high across the board. When Nokia and Qualcomm were alone and outside the view of their peers, those two firms surely pulled and tugged in support of their own commercial self-interests. Of course, every other participant in that same standard-setting process ultimately found itself in a similar, overlapping, confidential, bilateral negotiation. The net result was therefore presumably a dynamic that looked a lot like uncoordinated, competitive pricing.

Framed another way, collusion typically works either because the colluding parties have no incentive to defect from the group’s nefarious plan or because defection can be readily detected and punished by the other colluding parties.⁶¹ Neither of those statements is true as applied to RAND. So, for instance, retailers in a given city might collude to sell the latest video games at a price of \$50 or above. They might do so because, without an agreement, competitive pressures would drive that price down to \$20, leaving the retailers with little profit. This sort of collusion is plausible because each retailer can watch the other retailers to determine if they are fulfilling their end of the bargain. Lower the price for a quick sale, and the other retailers will likely notice and respond.

Alternatively, the retailers might collude in a more clever way, specifically by implementing a price-matching guarantee under which each retailer promises its customers that it will match the lowest price offered by any other retailer in the city. This time, collusion works because no retailer has any incentive to defect. Indeed, the dominant strategy for each retailer is to choose a high price and stick with it. Customers who are not comparing prices will just pay that high price and be satisfied. Customers who are comparing prices will see a lower price elsewhere, invoke the price-matching policy, but then buy from the original retailer anyway. Importantly, if each retailer analyzes the situation this same way, each will simply choose a

61. For a fun and readable introduction to these topics, see generally Christopher R. Leslie, *Trust, Distrust, and Antitrust*, 82 TEX. L. REV. 515 (2004).

high price, and thus the price-match promise will never in fact be invoked. Collusion is thus achieved without any monitoring because no retailer wants to defect.⁶²

My point? The RAND dynamic fits neither of these stories. Participants in standard-setting cannot enforce a collusive pricing scheme because the bilateral deals they implement are not public. That makes monitoring all but impossible.⁶³ And even if the RAND commitment were in truth a collusive strategy designed to benefit each standard-setting participant in the long run, each would nevertheless feel enormous pressure to defect from that strategy when negotiating its own private, bilateral deals. As I said above, Nokia wants to pay Qualcomm as little as possible for Qualcomm's patents and to receive from Qualcomm as much as possible for Nokia's patents. Those are exactly the incentives Nokia would have faced had there been no standard in the first place, and those incentives remain fully intact after a RAND commitment has been made. The idea that the RAND commitment supports some nefarious form of standards-based collusion, then, seems far-fetched.⁶⁴ An explicit, public, and enforceable industry-wide agreement as to price would be much more dangerous.⁶⁵

62. See Aaron S. Edlin, *Do Guaranteed-Low-Price Policies Guarantee High Prices, and Can Antitrust Rise to the Challenge?*, 111 HARV. L. REV. 528, 536–39 (1997).

63. This inability to monitor is to be celebrated to the extent that it stops anticompetitive collusion, but it is to be mourned to the extent that it interferes with what would otherwise be beneficial group policing. For example, because bilateral deals are shielded from public view, it is very difficult for standard-setting participants to enforce the “nondiscriminatory” portion of the RAND commitment.

64. I should point out that my remarks here assume that the RAND commitment is interpreted consistently with my remarks earlier in this Lecture. If RAND is not read that way, then the antitrust issues could be more significant. For instance, my interpretation sharply reduces the risk that a patent holder will be able to demand a royalty that exceeds the royalty he would have earned had all the relevant negotiations occurred prior to the standard being adopted. If that view is rejected, then RAND could be part of a collusive arrangement. A group of patent holders would vote one another's patented technologies into the standard, and then each would extract exaggerated royalties from implementing firms. RAND would make that bad act less obvious, because the prices actually charged would be confidential and hence harder for government authorities to evaluate. Central to my antitrust analysis, then, is an assumption that the patent damages issues are resolved in a way that appropriately constrains each patent holder's market power.

65. I want to emphasize again, however, that *ex ante* explicit group prices do have some offsetting charms. For instance, *ex ante* public prices would allow standard-setting participants to account for cost when comparing different suggested technical approaches. *Ex ante* public prices would also make more enforceable any nondiscrimination commitment. See *supra* note 63. Moreover, *ex ante* public prices would help patent holders coordinate in ways that might ironically reduce prices. See Douglas Lichtman, *Property Rights in Emerging Platform Technologies*, 29 J. LEGAL STUD. 615, 624–26 (2000) (explaining why firms might coordinate to reduce prices when, as here, they are each selling a complementary good); Lemley, *Ten Things*, *supra* note 10, at 159–61 (also discussing Cournot complementarity). Thus, while *ex ante* explicit group pricing could be abused, it could also promote efficiency, beneficial coordination, and competition.

IV. OTHER VIEWS

If my analysis thus far is correct, the RAND commitment is, at its heart, a mechanism by which private parties can delay pricing negotiations without inadvertently skewing the outcome of those negotiations. It is an implicit rejection of the standard patent damages regime (which would very much skew the outcome), and it is less problematic on antitrust grounds than the only obvious alternative: a group-wide, *ex ante*, explicit conversation about price.

Where, then, might other voices disagree? The most controversial part of my interpretation is the piece about patent damages. Most commentators clearly agree with me, echoing in whole or in part my concerns about triple damages and injunctive relief.⁶⁶ But, some commentators—and, most importantly, Qualcomm itself—have taken the position that a patent holder can invoke patent law’s classic damages regime even after having agreed to RAND.⁶⁷ The details of this contrary position have not yet been fully fleshed out. The academic commentary is thin, and Qualcomm’s several RAND cases all settled before Qualcomm’s view was fully documented. Nevertheless, I think it is easy to anticipate what this position would look like, and important to articulate it and make clear why it cannot possibly be right.

One possible interpretation would read the RAND commitment as simply a promise to make a reasonable offer. On this view, a patent holder subject to the RAND commitment must offer a reasonable royalty to each interested licensee; however, if a licensee rejects that offer, all bets are off, and the patent holder is at that point free to exercise its patent rights as if there had been no RAND commitment. I reject this interpretation because its predictable implication is to overcompensate patent holders. After all, there will always be enormous uncertainty over precisely what is and is not a reasonable royalty. Yet if the RAND commitment were read this way, a licensee who in good faith disagreed with a patent holder could pursue that disagreement only by taking the risk of paying double, triple, or

66. See Lemley, *Ten Things*, *supra* note 10, at 153, 158 (“The patentee has forgone the opportunity to sue for patent infringement and to seek injunctive relief and treble damages.”); Miller, *supra* note 11, at 374–78 (suggesting that courts interpret RAND to be “an irrevocable waiver of the patentee’s right to extraordinary relief for infringement, i.e., an injunction . . . or enhanced damages for willful or bad faith infringement”).

67. See, e.g., Gerardin & Rato, *supra* note 14, at 116–19 (arguing that patent holders ought to have the right to request injunctive relief unless they explicitly waive that right); Qualcomm Incorporated’s Brief, *supra* note 15 (“ETSI policies do not contain any provision precluding members from seeking injunctive relief when an infringer and potential licensee has rejected a FRAND licensing offer from the patent holder.”).

more, depending on the details of patent law's exaggeration regime. As a result, licensees would rationally accept high royalties, because the certainty of overpaying slightly would be more attractive than the distinct possibility of overpaying by a multiple.

A variant on this theme would be an interpretation that protects licensees, but only so long as they engage in good faith negotiation. That approach has some charm, but it puts enormous pressure on courts to determine whether a licensee is acting in good faith. I would not object to that if the test were a conservative one, such as a rule that imposed exaggerated damages only in instances where some smoking-gun e-mail made bad faith plain. But I worry about less reliable tests in that they would create the same uncertainty that I sketched above: a licensee acting in good faith would worry that a court might later misconstrue those intentions, and because of that the licensee would knowingly accept a moderately high royalty in order to avoid the risk of an astronomical one.

Another interpretation that would leave the door open to triple damages and injunctive relief is an interpretation under which the patent holder would be required to continually extend a reasonable offer, even after a licensee has previously turned down that offer. The idea here is that the would-be licensee's risk would be capped: the licensee would be exposed to exaggerated damages for as long as the dispute raged, but the licensee could end that exposure at any time by accepting the patent holder's always-open offer. The problem this time is that the period of exaggerated damages could still be significant, because patent litigation and its reasonable appeals can easily last years. This would again put an enormous thumb on the scale, pressuring licensees to accept a royalty that is higher than reasonable but not so high so as to warrant the risks of litigation.

In resisting these alternative views, I do not mean to ignore the opposite problem: under my interpretation, RAND does little to encourage standard-setting participants to negotiate rather than litigate.⁶⁸ Remember, patent law solves this problem by threatening to impose exaggerated damages on any infringer who could have negotiated, and should have negotiated, but in fact

68. See Geradin & Rato, *supra* note 14, at 117–19 (expressing concern that, under interpretations like my own, “patentees would arguably prefer to settle for a license on terms that would not provide a fair return on their investment, in other words terms which would not comply with FRAND, rather than face lengthy, onerous and uncertain court proceedings for the award of damages”); Miller, *supra* note 11, at 390 (raising similar concerns).

did not. RAND dismantles that exaggerated remedy regime (for good reason) but then offers nothing to replace it. The upshot might be that patent holders who agree to the RAND commitment will in the end be undercompensated. They will have to either discount their rates in order to lure licensees to the table or incur the costs, risks, and delay of litigation in order to ultimately be paid their due. I favor this distortion over the opposing one, however, because it should be much smaller. The cost of litigation can be large, but it will almost always be rounding error when compared in size to the exaggeration built into patent law's damages regime. Besides, courts in fact offset much of this distortion by requiring adjudged infringers to pay expenses, attorney's fees, interest, and the like.⁶⁹

V. CONCLUSION

My ambition in this Lecture was to articulate the reasons why firms in the standard-setting context opt for the RAND commitment rather than explicitly negotiating price, and relatedly to explain what the RAND commitment as a result likely means. My answers are hopefully by this point evident. Firms choose RAND because they want to delay pricing negotiations without inadvertently skewing the outcome of those later deals. As a result, RAND must be interpreted to reject much of the conventional exaggerated patent damages regime.⁷⁰ The result is not a perfect framework for patent licensing. However, there is no obvious story about anticompetitive behavior; the possibility of voluntary delay does open the door to significant efficiencies; and, surprising as it might be, firms involved in standard-setting obviously believe that those efficiencies outweigh the associated costs.

Am I therefore a fan of the current RAND approach? Hardly. The success of the RAND commitment in the end turns on the

69. See Miller, *supra* note 11, at 390 (suggesting that fees be shifted "in cases where the reasonable license terms the court sets are not materially different from those the patentee had been willing to accept before the litigation").

70. One interesting implication: patents subject to a RAND commitment ought not be eligible for any remedy at the International Trade Commission (ITC). As readers here surely know, patent holders are in general able to bring patent cases either in federal district court or at the ITC. In federal court, a patent holder can sue for money and also injunctive relief. At the ITC, a patent holder can sue for an importation ban that would bar infringing products at the border. In this Lecture, I implicitly focus on district court litigation, and I therefore argue that injunctive relief is not appropriate in the context of a RAND commitment. As applied to ITC proceedings, however, the same logic would suggest that importation bans are also inappropriate. For general background on the ITC and its role in patent litigation, see Vivek Koppikar, *Evaluating the International Trade Commission's Section 337 Investigation*, 86 J. PAT. & TRADEMARK OFF. SOC'Y 432, 434 (2004).

ability of a court to calculate a non-exaggerated reasonable royalty. If courts tend to pick royalties that are too high, then private parties negotiating in the shadow of litigation will also choose too-high rates. If courts tend to pick royalties that are too low, then private parties will similarly strike inefficiently modest deals. The only plausible happy story is a story where courts have no predictable or systematic bias. Of that I am enormously skeptical.

More broadly, though, I dislike RAND as it exists today because it could easily be so much more. This is a clause invoked by a veritable who's who of technology and electronics companies. One would think that when firms of that caliber gather together to establish an elaborate agreement about the future of some promising new technology, they would at the same time opt out of the default legal regime and establish their own expert arbitration process to resolve future disputes accurately and at an appropriate pace. But no. That frankly boggles the mind. Where conflicts are a surprise—for instance, any classic tort—the default legal regime is the only option. Prior to a car crash, I cannot by contract agree with the other driver that we will use a more efficient mechanism for allocating fault. But here, sophisticated private parties can foresee conflict, they know that the subject matter of that conflict will be enormously difficult for a lay judge or lay jury to evaluate, and they are already in contact with one another through the standard-setting process. Private dispute resolution should naturally follow.⁷¹

So, yes, because billions of dollars are today at stake across a host of important industries, courts should interpret RAND with an eye toward the purposes and policies articulated here. And yes, as new RAND commitments are written, standard-setting participants ought to make explicit their repudiation of patent law's exaggerated damages regime. But just as important, standard-setting organizations in the future need to invest in alternative dispute resolution. RAND as it exists today can only be as good as the courts that will enforce it. And with so much inventive activity on the line, that seems hardly good enough.

71. Again, I am joined here by a chorus of academic voices. *See, e.g.*, Miller, *supra* note 11, at 392–93 (“Because the linchpin of a RAND license dispute is essentially factual—what term is reasonable and nondiscriminatory, under the circumstances?—arbitration by someone with technical or licensing knowledge is especially fitting.”); Lemley, *supra* note 7, at 1966 (arguing that private dispute resolution would be “quicker and cheaper than resorting to the courts” and “may also permit the disputants to take advantage of . . . industry expertise”).

EXHIBIT 19



IPR issues and ITU's standardization activities

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 - Meets every four years
- ITU Council acts on behalf of the Plenipotentiary Conference in between PPs
 - Meets annually
 - Composed of 48 Member States

Our Mission

- Help bridge the digital divide
- Manage radio spectrum
- Develop international standards

Global Standards: Supporting Innovation

- ITU standards' work done mostly in Study Groups
- Produce "recommendations" (i.e. international non-binding standards)
- Partnership between private sector & government
- Consensus-based approach, flexible process
- Fast, transparent, equitable procedures

ITU's Patent Policy

- Since 2007, ITU, ISO/IEC have a common patent policy
- Purpose: To ensure that patents embodied in ITU Recommendations (standards) are accessible to everyone without undue constraints.

ITU's Patent Policy

- No technical limitations on the inclusion of patents in ITU standards.
- Disclosure rule:
“...any party participating in the work of ITU, ISO or IEC should, from the outset, draw the attention of the Director of ITU-TSB, the Director of ITU-BR or the offices of the CEOs of ISO or IEC, respectively, to any known patent or to any known pending patent application, either their own or of other organizations...”

Current issues debated

- Most IPR issues arising in ICT standardization are very complicated
- IPR policies of major ICT standardization organizations (“SDOs”) are similar
- SDOs believe their IPR policies are effective
- General belief that RAND policies work well because they reflect a balanced approach
- Commercial motivations often underline some of the more contentious debates in ICT standardization

Current issues debated

- Transfer of the patent
- Definition of RAND
- Ex Ante debate
- Open Standard

Transfer of the patent

- Is the licensing commitment made by the original patent holder binding on later owners of the patent ?
Depends on specific legal jurisdiction
- US: FTC v. N-DATA Complaint
- FTC believed that N-Data violated Section 5 of the FTC Act by engaging in unfair methods of competition and unfair acts or practices regarding its enforcement of patents essential to implement a computer network standard
- N-Data reneged on a prior licensing commitment to a standard setting body not to increase the price of its technology

How is RAND determined and by whom ?

- No uniform definition of RAND
- The licences and their prices are generally negotiated on a bilateral basis between the patentee and each licensee, outside the SDOs
- The licensor and the licensee may not agree whether the offered terms and conditions are in compliance with the patent policy of the SDO
- Disputes are settled outside the SDOs between the parties concerned based on the applicable law

Ex ante debate

- The *ex ante* term may involve several things
- Most SDOs support *ex ante* disclosure of:
 - Patents likely to have essential claims
 - Commitment to offer a license to essential claims
 - Voluntary disclosure of licensing terms
- Almost no SDOs mandate the discussion of licensing terms or authorize group discussion of the proposed licensing terms

***Ex ante* debate**

- Some believe that:

The *ex ante* disclosure of licensing term may facilitate informed decisions by the participants in the standard-setting process, and enables competition based on both technology and price when deciding on a standard

It may avoid disputes over the licensing terms after the standard has been adopted and facilitate rapid implementation of adopted standards

Open Standards

- No universally accepted definition of this term
- ITU definition:

Standards made available to the general public and are developed (or approved) and maintained via a collaborative and consensus driven process;

Other elements of "Open Standards" include, but are not limited to: reasonably balanced; due process; IPRs ("RAND" policies); quality and level of detail; publicly available;

Open Standards

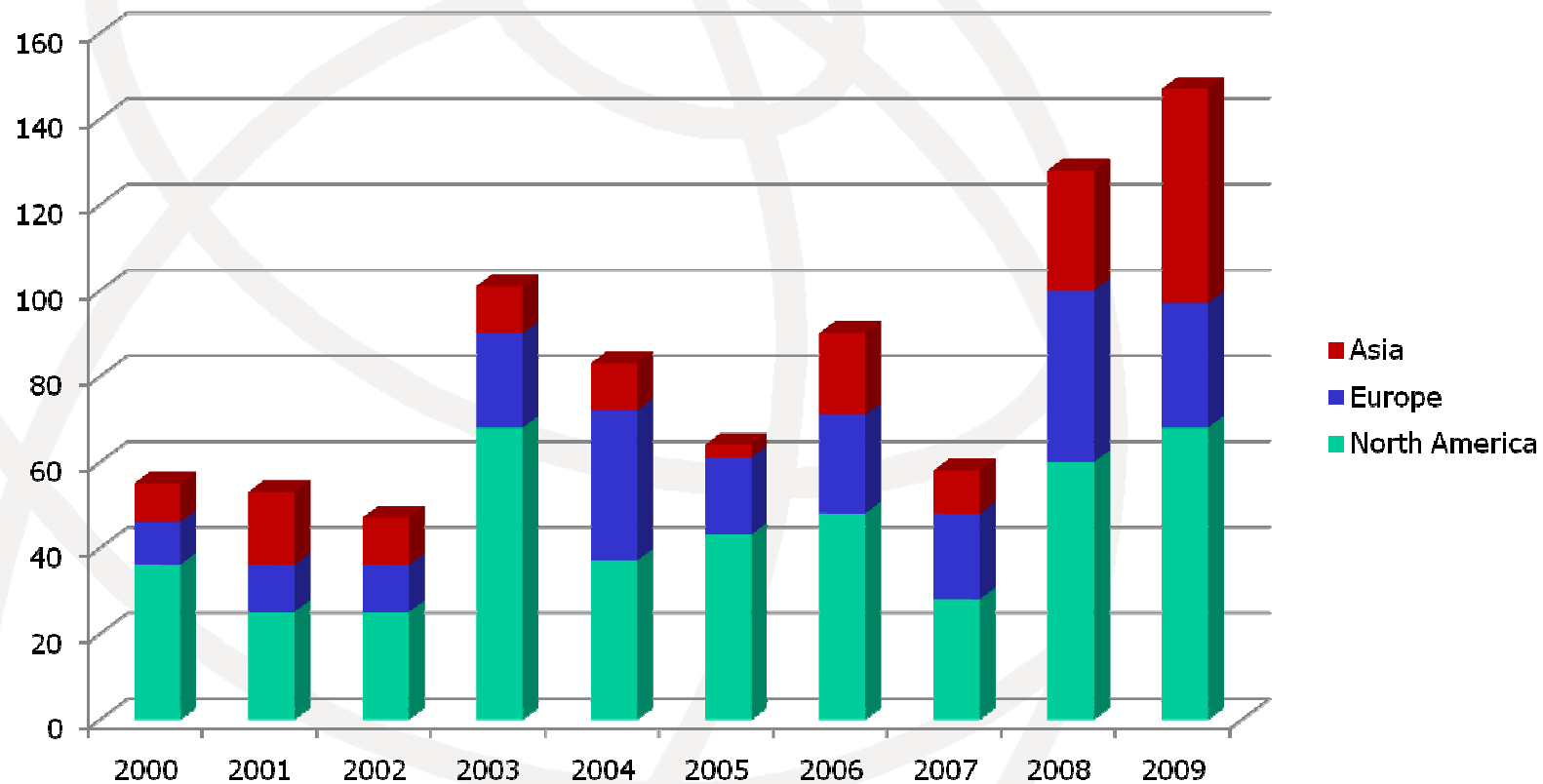
- A minority believes that “open standards” should be « free to use »
- This new definition can have negative effects

On SDOs that have “RAND” policies

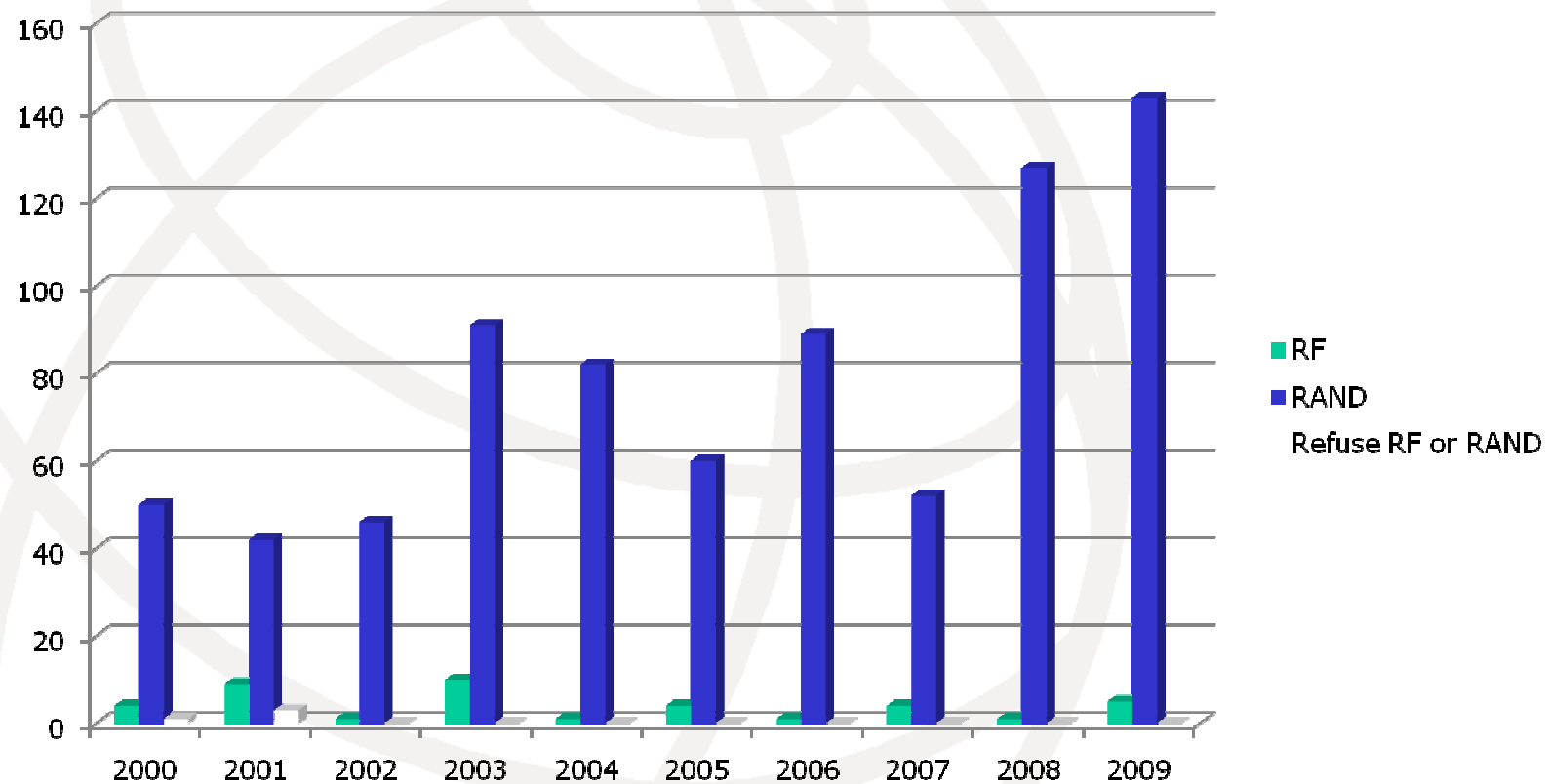
On patent holder participation in SDOs

On innovation

Number of Patent Declaration Statements received by region



Declared Licensing options over the last decade



Patent Declaration Statements per area of standardization

- 8 of the 23 areas of standardization have received no Patent Declaration Statements
- The areas of standardization that receive most Patent Declaration Statements relate to voice over IP and multimedia codecs (G & H Series).

Useful links

- ITU home page: www.itu.int
- History and landmarks:
<http://www.itu.int/net/about/history.aspx>
- ITU-T home page (ITU's standardization activities): <http://www.itu.int/ITU-T/index.html>
- Patent Policy: <http://www.itu.int/ITU=T/ipr>
- Patent database:
<http://www.itu.int/ipr/IPRSearch.aspx?iprtype=PS>

EXHIBIT 20

Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association's Antitrust and Competition Policy

Antitrust and competition laws throughout the world rest on the premise that competition in the provision of products and services is the best way to ensure that consumers and other users receive maximum innovation and quality at the lowest possible prices. But sometimes effective competition requires a measure of cooperation among competing firms.

Standards development is one of those areas. Standards development serves one part of the IEEE's mission – advancement of global prosperity by fostering technological innovation – but it can do so only if the standards development is conducted consistent with the antitrust and competition laws that regulate the nature and extent of cooperation in which competitors can legitimately engage.

The IEEE-SA is an international membership organization that provides a standards program serving the global needs of industry, government, and the public. A violation (or claims of violation) of competition laws will jeopardize what all participants are working so hard to build; will impede the IEEE mission; and may expose participants and their employers to the risk of imprisonment and other criminal penalties, civil remedies, and significant litigation costs. Even if a competition-law case or investigation is ultimately dropped, that will often happen only after the parties have spent considerable resources in responding to information requests and defending against the claims.

The IEEE-SA wants to help all of its participants avoid competition-law problems. Many IEEE-SA participants receive antitrust/competition-law compliance training from their employers, and IEEE-SA participants should always consult with their own or their company counsel when they have competition-law-related questions. This brochure is not intended to replace that competition-law training, advice, or other competition-law-related resources that participants may have available to them; rather, this brochure is intended to highlight the competition-law risks that are most pertinent to standards development and to explain the IEEE-SA's policies with respect to competition law matters.

1. General Background

What are the antitrust and competition laws? In the U.S., it is called "antitrust law," and elsewhere it is called "competition law." But regardless of the label, most countries have substantially similar laws regarding this matter. Generally speaking, most of the world prohibits agreements and certain other activities that unreasonably restrain trade.

What is monopolization? Monopolization is the obtaining of a monopoly – the ability to obtain profit by restricting output and selling at a higher price – through wrongful means. For example, a company might unlawfully convert its patents into monopoly power by misleading other participants in the standards organization into incorporating the company's patented technology into a standard under the false impression that no patents were involved.

What are some examples of agreements that unreasonably restrain trade? Competition authorities throughout the world uniformly condemn actions that are referred to as “naked restraints on trade” – that is, agreements that do nothing more than limit competition between competitors. The classic examples that could arise in the standards process – and the kinds of violation that most frequently result in significant jail time for the participants – include:

- price fixing (for example, where standards participants or other competitors agree on the prices that they will charge for compliant products);
- output restrictions (for example, where standards participants or other competitors agree on how much of a compliant product they will each produce);
- allocations of customers or territories (for example, where competitors agree on where or to whom they will each sell compliant products).

Other kinds of violations can also arise in the standards process. For example, selecting one technology for inclusion in a standard is lawful, but an agreement to prohibit standards participants (or implementers) from implementing a competing standard or rival technology would be unlawful – although as a practical matter, a successful standard may lawfully achieve this result through the workings of the market.

So is it okay to talk about prices or output levels in an IEEE-SA meeting as long as we don't reach an agreement? No, it's not okay. First, you can't always control where the discussion will go – it may end up in undesired areas. Second, if agreeing on the subject would be unlawful (such as the respective selling prices of compliant products), then that subject should not be discussed. And third, it's not up to you to decide whether your words and conduct amount to an agreement – in the U.S., that decision gets made by a judge using the peculiar rules of evidence that only courts use and by a jury that is unlikely to know anything about your industry or business. The whole question about your actions will come up after the fact, and with the sure vision of hindsight, any questionable discussion or debate could be seen to have led to a tacit if not an explicit agreement that is prohibited by law. Do not put the IEEE, your company, your colleagues in the standards community, or yourself at risk by discussing these topics.

So can we discuss costs of components or patent licenses? The IEEE-SA permits certain discussion of costs, subject to some important limitations. See [subclause 5.3.10.3](#) of the [IEEE Standards Board Operations Manual](#) and [Section 2](#) and [Section 4](#) of these Guidelines.

What else can we discuss? IEEE wants you to have the maximum flexibility to discuss topics relevant to developing a standard while also adhering to certain rules designed to minimize risk. It is impossible to identify all the topics that you *can* discuss, but here are some that you *cannot* discuss:

- prices at which products or services implementing the standard should be sold ("price" includes discounts, terms, and other conditions of sale);
- profits or profit margins;
- individual companies' market shares or sales territories;
- allocation of customers, markets, production levels, or territories; or restricting the customers to whom, or territories in which, a company may sell or resell products;
- using standards or certification programs to exclude suppliers or competitors from the marketplace for any reason other than cost-performance or technical considerations;
- conditioning the implementation of a standard on the implementer's use of products or services from a particular supplier [such as requiring use of a particular manufacturer's components or requiring implementers to use a particular service provider(s) for compliance certification];
- bidding (or terms of bids) or refraining from bidding to sell any product or service;
- any matter which restricts any company's independence in setting prices, establishing production and sales levels, choosing the markets in which it operates, or the manner in which it selects its customers and suppliers.

In addition to topics that are prohibited on purely competition-law grounds, certain topics are not productively discussed in technical standards-development meetings. *The [IEEE-SA Standards Board Operations Manual](#)* prohibits discussion of these topics as well:

- The status or substance of ongoing or threatened litigation;
- The essentiality, interpretation, or validity of patent claims;
- Desirable versus undesirable terms of patent licenses;
- Specific patent license terms or other intellectual property rights, other than distribution of Accepted Letters of Assurance as permitted under the IEEE-SA patent policy (see [section 6.2](#) of [IEEE-SA Standards Board Bylaws](#)). (*For guidance on this topic, see section 2 below.*)

What if our meetings occur outside the U.S.? Whose law governs? Most countries will apply their antitrust and competition laws to any conduct that has a substantial effect in their country, regardless of where that conduct took place. The IEEE-SA's Antitrust and Competition Law Policy applies to IEEE-SA activities wherever the meetings occur.

2. Cost Discussions

Discussion of the cost of inputs necessary to create a compliant implementation of a standard are treated differently from discussions of prices at which compliant implementations can or should be sold. There is no useful or appropriate reason to discuss selling prices of implementations – each implementer of the standard should use its own independent business judgment to make that decision. In contrast, there is a legitimate reason to discuss costs of inputs used in implementation.

Different technical approaches may have different benefits, and a sensible comparison may involve an understanding of whether or not the technical differences would justify the cost differential (if known). Nevertheless, as a matter of policy, the IEEE-SA recommends that meetings of technical experts remain just that – technical meetings. While technical meetings should remain focused on the complexity, performance, and quality implications of proposals, they should also permit sufficient discussion to enable participants to understand the *relative* cost differentials (or to be able to take information back to their respective companies to have that kind of discussion and analysis internally).

With regard to the costs of inputs used in implementing a standard, the only permitted discussion is the degree to which such costs may differ. Examples of permissible discussion topics would include differences in comparative component costs, operating costs, licensing costs, or the aggregate of such costs. The importance of this restriction on discussion is reinforced by the understanding that participants in the development of a standard often come from multiple stages of the supply chain (e.g., the input cost of a component to a system manufacturer is the output price of a component supplier).

Thus, in standards development technical activities, participants may discuss the relative costs (in terms, for example, of percentage increases or decreases) of different proposed technical approaches in comparison with the relative technical performance increases or decreases of those proposals. However, participants are not to discuss any specific patent licensing terms and conditions (including any pricing information).

Discussion of relative costs in technical standards-development meetings should be presented in a way that can be substantiated and that permits other participants to replicate the cost analysis. Participants are reminded that false or misleading cost comparisons carry their own legal risks. Moreover, actual costs may well differ from one implementer to another.

There may be costs associated with patent claims identified in an Accepted Letter of Assurance (or “Accepted LOA,” which is defined in [subclause 6.1](#) of the [IEEE-SA Standards](#)

[Board Bylaws](#)). Those costs may be included in comparisons when appropriate but only on a relative basis, subject to the procedural and other direction discussed in these guidelines. However, specific licensing fees, terms, and conditions, or the meaning, validity, or essentiality of the patents with which they are connected are not permissible topics of discussion. For examples of permissible relative cost comparisons, see [Section 4](#).

A patent-holder's disclosure of its maximum royalties and other licensing fees and terms is completely voluntary. Patent-holders who have not voluntarily disclosed maximum terms shall not be coerced into disclosure.

Thus, participants, through either discussions or relative cost comparisons, shall not criticize any particular Accepted LOAs for not providing specific maximum terms or coerce any patent holder into supplying such terms. Nevertheless, a participant or a comparison may state that some cost elements of a particular technology approach are not known (because maximum terms have not been included in an Accepted LOA).

The IEEE-SA believes that, as a general matter, having more information – including cost information – is better than having less. This does not mean that cost should be the sole or exclusive factor in technology selection. Relative costs can be a factor in technology selection, as can the absence of cost information. Nonetheless, the IEEE-SA has not created any policy expectation, endorsement, or presumption in favor of selecting a technical approach for which a patent holder has disclosed its maximum fees and terms. Participants in IEEE-SA standards-development activities are free to exercise their own judgment as to whether a proposal with higher known relative costs (including costs of potentially Essential Patent Claims) is or is not superior to a proposal with lower known relative costs (including costs of potentially Essential Patent Claims).

Again, participants should never discuss the price at which compliant products may or will be sold, or the specific licensing fees, terms, and conditions being offered by the owner of a potential Essential Patent Claim. With respect to disclosures made to the IEEE-SA in the context of its standards-development activities, disclosure of maximum licensing fees, terms, and conditions is completely voluntary and may only occur through LOAs submitted directly to IEEE-SA. Technical considerations should generally remain the primary focus of discussions in IEEE-SA standards-development technical activities.

3. Some Practical Guidelines

Written Meeting Agenda: Due process is best served with written agendas available in advance of standards meetings. Each IEEE-SA meeting must be preceded by a notice and proposed agenda made available to prospective participants. This is to notify the participants of the time and place of the meeting and the nature of the business to be conducted.

Written Minutes of Meetings: Minutes of meetings should be prepared and made available.

Informal Meetings and Other Communications. Topics that are prohibited from discussion on competition-law grounds at any formal IEEE-SA meetings shall not be discussed in e-mail reflectors or other electronic communications provided under the auspices of the IEEE-SA. Likewise, those topics should not be discussed in hallway conversations, luncheons, social events, or in any gathering held in connection with IEEE-SA standards-development activities (unless the only people present are all employees of the same company).

No Agreements to Comply. IEEE-SA standards are voluntary. There should be no agreement to implement them or to adhere to them or any discussions as to when participants will begin to offer products conforming to the standards. Participants involved in IEEE-SA's standardization activities must adhere to IEEE-SA Procedures and Patent Policies.

Customer Surveys and Statistical Programs. Individual participants may make presentations about broad market potential or market requirements for informational purposes. No IEEE-SA standards group may engage in, direct, or encourage its members to engage in surveys of customers or gathering of statistical data about market requirements, markets, or customers without appropriate review by IEEE-SA legal counsel (which is arranged through the IEEE-SA Staff Liaison for your working group or technical committee).

Importance of Chair. Participants are expected to comply with IEEE-SA policies, but the chair of the working group, task group, or other standards-development meeting plays a significant role in facilitating this compliance. The chair should ensure that the Call for Patents is announced at the beginning of every standards-development meeting (whether conducted in person or by telephone). Using the [patent slide-set](#) (including the competition-law cautions) is the preferred method for this announcement. During a meeting, the chair should ensure both that the discussion does not stray into impermissible topics and that IEEE-SA policies are not improperly used to suppress permissible discussions. The chair should also encourage participants not to remain silent if impermissible discussions do occur.

4. Some Examples

The following are examples to assist presenters, participants, and chairs in understanding permissible comparisons of relative costs (including costs for potentially Essential Patent Claims). There may be other permissible forms of comparing relative costs, and these examples are not intended to exclude other permissible comparisons.

These examples use the term "Accepted Letter of Assurance" (or the shorter form "Accepted LOA"). That term is [defined](#) in the [IEEE-SA Standards Board Bylaws](#) and is used in the [IEEE-SA Standards Board Operations Manual](#).

The particular presentation formats used here are not intended as a mandatory template for all presentations. For example, each of these examples uses titles associated with the technological substance of the proposal. Proposal names should be fair and accurate, but the IEEE-SA does not dictate any particular nomenclature for technology proposals. Proposals will sometimes be identified with a particular company or companies. Where a proposal is identified with a single company, it is still permissible to make statements about the relative costs (of patents or other cost elements) for that technology, even if the only known potentially Essential Patent Claims for that technology are owned by a single company.

A presentation that references any Accepted LOA should always indicate that Accepted LOAs may contain other material terms and that participants should consult the Accepted LOAs for a complete statement of terms disclosed (if any). A presentation that references any Accepted LOA should also state that there may be other potentially Essential Patent Claims that have not been identified or for which no statement of assurance has been received.

Example 1.

For “Amber-Teal Technology Proposal,” there is a single Accepted Letter of Assurance, and in the Accepted LOA the submitter has voluntarily disclosed that it will not seek more than a maximum one-time licensing fee of US \$5,000. For “Blue Technology Proposal,” there are two Accepted LOAs, and in these Accepted LOAs the submitters have voluntarily disclosed that they will not seek more than, respectively, maximum one-time licensing fees of US \$5,000 and US \$15,000, resulting in a cumulative one-time licensing fee of US \$20,000. There are Accepted LOAs for “Chartreuse Technology Proposal” and “Green Technology Proposal,” and in these Accepted LOAs the submitters have not stated maximum licensing rates or fees. A presenter could present the information as follows:

	Amber-Teal Technology Proposal	Blue Technology Proposal	Chartreuse Technology Proposal**	Green Technology Proposal
Optics	$2n$	$3n$	$4n$	$1.6n$
Silicon	$3q$	$4q$	$2q$	q
Known Costs of potentially Essential Patent Claims*	x	$4x$	not known***	not known***

* Presentations shall include a disclaimer, such as “Based on ‘Not to Exceed’ Costs disclosed in Accepted LOAs on file with the IEEE-SA. Accepted LOAs may contain other material terms not discussed in this presentation. View a [complete list of Accepted LOAs](#), including a complete statement of terms disclosed (if any). In addition, this comparison discloses costs only for

patent claims that have been identified as potentially essential. Other Essential Patent Claims may exist for which a Letter of Assurance has not been received."

** In this example, each proposal is identified by words describing the technology. If the "Chartreuse Technology Proposal" had instead been identified as the "Company C Proposal," it would still be permissible to make the statement that "maximum costs of potentially Essential Patent Claims" for the Company C Proposal are "not known." (The IEEE-SA does not require or encourage that a proposal be identified with a specific company or companies.)

*** See note above. A comparison can note that maximum licensing terms for a proposal are not known even if there is only one Accepted LOA (that does not disclose maximum terms) on file with the IEEE-SA.

Example 2.

There is a single Accepted LOA for "Green Technology Proposal," and in its Accepted LOA the submitter has voluntarily disclosed that it will not seek more than a maximum one-time licensing fee of US \$5,000. There are two Accepted LOAs for "Blue Technology Proposal," and in these Accepted LOAs the submitters have voluntarily disclosed that they will not seek more than, respectively, maximum one-time licensing fees of US \$5,000 and US \$15,000, resulting in a cumulative one-time licensing fee of US \$20,000. There are no Accepted LOAs for "Aquamarine and Fuchsia Technology Proposal," although information for non-IP costs is available (and, in this example, are significantly greater than non-IP costs for the two proposals for which there are Accepted LOAs). The information could be presented as follows:

	Green Technology Proposal	Blue Technology Proposal	Aquamarine and Fuchsia Technology Proposal
Optics	$2n$	$3n$	$30n$
Silicon	$3q$	$4q$	$9.5q$
Known Costs of potentially Essential Patent Claims*	x	$4x$	none**

* Presentations shall include a disclaimer, such as "Based on 'Not to Exceed' Costs disclosed in Accepted LOAs on file with the IEEE-SA. Accepted LOAs may contain other material terms not discussed in this presentation. View a [complete list of Accepted LOAs](#), including a complete statement of terms disclosed (if any). In addition, this comparison discloses costs only for patent claims that have been identified as potentially essential. Other Essential Patent Claims may exist for which a Letter of Assurance has not been received."

** Technology believed to be in public domain, but participants should verify.

Note: The table in Example 2 would also apply where the Accepted LOA for the “Aquamarine and Fuchsia Technology Proposal” states that the submitter will offer licenses on a “royalty-free” basis (sometimes also called RAND-Z or “RAND-zero royalty”).

Example 3.

There is a single Accepted LOA for “Green Technology Proposal,” and in its Accepted LOA the submitter has voluntarily disclosed that it will not seek more than a maximum one-time licensing fee of US \$5,000. There is a single Accepted LOA for “Blue Technology Proposal,” and in its Accepted LOA the submitter has voluntarily disclosed that it will not seek more than a maximum royalty rate of 1.6% of sales. There is a single Accepted LOA for “Aquamarine and Fuchsia Technology Proposal,” and in its Accepted LOA the submitter has not disclosed any maximum licensing rates. If it is not possible to provide a meaningful relative cost comparison between a one-time fee and a percentage of sales rate, then this information could be presented as follows:

	Green Technology Proposal	Blue Technology Proposal	Aquamarine and Fuchsia Technology Proposal
Optics	$2n$	$3n$	$1.2n$
Silicon	$3q$	$4q$	$2.2q$
Known Costs of potentially Essential Patent Claims*	known	known	not known

* Presentations shall include a disclaimer, such as “Based on ‘Not to Exceed’ Costs disclosed in Accepted LOAs on file with the IEEE-SA. Accepted LOAs may contain other material terms not discussed in this presentation. View a [complete list of Accepted LOAs](#), including a complete statement of terms disclosed (if any). In addition, this comparison discloses costs only for patent claims that have been identified as potentially essential. Other Essential Patent Claims may exist for which a Letter of Assurance has not been received.”

EXHIBIT 21
FILED UNDER SEAL